The Builder.

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"Parkside," Albert Gate.....Messrs. Hart & Waterhouse, Architects.

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Protection of Ancient Monuments.

THE failure of the recent effort to save Crosby Hall has induced the Local Government, Records, and Museums Committee of the London County Council to present a special memorandum to the Council (which is on the Agenda but has not yet been considered), recommending that steps should be taken to extend the provisions of the Ancient Monuments Acts (1882 and 1900), with the view of preventing the demolition of such buildings as Crosby Hall.

As things at present stand, by the more recent Act the Commissioners of Works, where they are of opinion that the preservation of any monument is a matter of public interest, on account of historic, traditional, or artistic interest attaching to it, may, at the request of the owner, consent to become guardians of it under the provisions of the earlier Act of 1882, which provides that an owner of any ancient monument may by deed constitute the Commissioners of Works guardians of it and render them responsible for its maintenance. The Commissioners may also purchase any monument within the meaning of the Act; and the Act of 1900 also empowers County Councils to become guardians of ancient monuments, or to purchase them by agreement. The public have a right to access to all monuments which by purchase have become the property of the Commissioners of Works or of any County Council; but where the authorities are guardians only the permission of the owner must be obtained—as is quite fitting.

But the Committee point out that all this administrative machinery, may be rendered futile by the fact that the exercise of these powers is dependent in the first instance on the consent of the owner of the property; a position of things which, as we urged when the Act was passed, is completely illogical and unsatisfactory. The ostensible object of both these Acts was to prevent remains which were of public interest being destroyed or allowed to go to ruin through the vandalism or the neglect of the owner. The intelligent and careful owner of an ancient monument we have no need to take precautions against; he is likely, during his own lifetime, to guard it as well as any public authorities would; it is the stupid or indifferent owner against whom we have to guard; and the humour of the situation is that no restraint can be put upon him except by his own request or permission, which as a rule he is the last kind of person to give. Even the advantage of being able to shift the responsibility and expense of maintenance from his own shoulders on to that of a public authority would hardly attract that kind of very British type of landowner whose boast is that he can do what he likes with what is his own.

The Committee, having regard to this condition of things, recommend, first, that a schedule should be prepared of all monuments in England and Wales which are worth preservation; and that compulsory powers of purchase should be vested in some authority, so that, if it were desired to purchase any interesting monument or building, the price for the property could not be enhanced beyond its commercial value. The Committee suggest that the mere scheduling of monuments as valuable, even without the compulsory purchase powers, would probably have saved Crosby Hall; it would then have been established beforehand as a building of historic value, and this idea would have been connected with it, instead of depending only on a sudden and unexpected appeal to a surprised public for its preservation.

We hope that the proposals of the Records and Museums Committee will be accepted and supported by the Council, and that it will use its best efforts to induce Parliament to make the requisite changes in the law. It is absurd that we should be in the position of losing monuments of the greatest archæological or historic value, because they are temporarily in the hands of some landowner who is indifferent to them, and that the county should be dependent on the initiative of this very owner to have them put under proper surveillance. We are rapidly losing memorials of value in this way, and the loss of others is continually threatened. Compulsory powers are necessary, and should be obtained without delay.

As to Crosby Hall, the best thing to have done with it would have been to retain and utilise it as a museum of local antiquities.

WORKING LOADS ON BRICKWORK.

THERE are probably few questions connected with building on which there is less definite agreement than that of the loads which can be safely placed on various descriptions of brickwork.

It is, of course, impossible to determine the safe values for brickwork with the exactness that is possible in dealing with materials, such as mild steel, in which comparative uniformity of strength and workmanship can be relied upon. At the same time, it is necessary to have working rules, and there can be little doubt that the absence of any such generally recognised standards is apt to lead in practice to the use of steel or cast-iron where brick piers would be more fireproof and equally suitable; and, in some cases, to the embedding of stanchions in piers which could, with little or no increase in size, be made in themselves capable of taking the required loads.

The best available information as to the strength of the ordinary descriptions of brickwork in use in this country is undoubtedly that contained in the official Report (published in 1905) of the brickwork tests carried out by the Science Committee of the Royal Institute of British Architects; but, owing to the absence of any authorised conclusions as to the results, it may be doubted whether their publication has had sufficient influence on actual practice. These results are well known and are generally accessible; for the purposes of this article they may be summarized as follows:—

The piers in Series I. and III. were tested at from eighteen to twenty-two weeks' age. Those in Series II. (not included above) were tested at forty-three to forty-seven weeks, and are, therefore, not strictly comparable. The lime mortar consisted of 1 of grey stone lime to 2 of sand, and the cement mortar of 1 of cement to 4 of sand.

The Committee gave no indication of their opinion as to the factor of safety which should be used in connexion with the results; and the question is one which does not admit of easy settlement, as it cannot be pretended that the conditions when a pier is crushed within the space of half an hour by mechanical pressure are identical with those which obtain in actual building practice, where loads are applied gradually and the pier has time to take up its bearings. It may fairly be assumed that the load under which a pier fractures in the testing machine is less than that which it would carry under the conditions of actual work. In the case of the tests under consideration, the question is complicated by the fact that, as a glance at the figures will show, the difference between the results of the first series of piers and those of the final series (which were more carefully built) was so extreme as to render of doubtful utility any attempt to arrive at an average between the two.

It may be taken generally that tests should be made on carefully-executed work; as, while the standard of good work may be taken as fairly uniform, there is hardly any limit to the badness of inferior work. The contingency of the occurrence of inferior work should be provided for in the factor of safety. It is therefore proposed to take the averages of the final series of tests only, and to apply experimentally a factor of safety of $\frac{1}{8}$th of the loads at which fracture commenced. On this basis the safe loads for the various descriptions of brickwork included in the tests would work out as follows:—

TABLE II.

Institute Tests, Series III.; $\frac{1}{8}$th fracturing loads.

Description of Brickwork.	In Lime Mortar.	In Cement Mortar.
	Tons per sq. ft.	Tons per sq. ft.
London stocks	2·85	5·49
Gaults	3·09	7·45
Flettons	4·82	8·78
Leicester reds	5·63	12·47
Wire cut blue Staffs	4·82	16·99

TABLE I.—*R.I.B.A. Tests of Brickwork*, 1895 *to* 1897. *Series I. and III.*

Description of Brickwork (height of piers, 6 ft.; least width, 1 ft. 6 in.).	Average Crushing Load of Single Bricks.	No. of Series.	No. of Piers Tested.	Average.	
				Fracturing Load.	Crushing Load.
	Tons per square foot.			Tons per square foot.	
London stocks in lime	84·27	I.	1	4·18	10·41
		III.	2	14·25	18·64
London stocks in cement		I.	2	10·28	14·93
		III.	2	27·45	39·29
Gaults in lime	182·2	I.	2	5·58	21·92
		III.	2	15·44	31·14
Gaults in cement		I.	2	12·01	17·79
		III.	2	37·24	51·34
Flettons in lime	220·85	III.	2	24·08	30·68
Flettons in cement		III.	2	43·88	56·25
Leicester reds in lime	*382·1 for half-bricks; say, 509·5 for whole bricks	I.	2	15·65	30·74
		III.	2	28·14	45·36
Leicester reds in cement		I.	2	72·82	58·45
		III.	2	62·33	83·36
Staffs blue (wire cut, not pressed) in lime	*701·1 for half-bricks; say, 934·8 for whole bricks	I.	2	28·53	74·30
		III.	2	24·08	114·34
Staffs blue (wire cut, not pressed) in cement		I.	2	31·69	72·80
		III.	2	84·69	135·43

* The crushing loads for half-bricks have been reduced to their approximate equivalents for whole bricks, in accordance with the conclusion arrived at by the Committee that, excluding stock bricks, it would appear that bricks tested as half-bricks may be expected to crush with about 25 per cent. less pressure per square foot than the same bricks tested as whole bricks.

Fig. 1 shows diagrammatically the relative safe loads on piers, as thus arrived at, as compared with the relative crushing loads on the single bricks.

It will be seen that, in both kinds of mortar, the piers built of Gault bricks show low relative safe loads as compared with the relative crushing loads on the single bricks. The figures for the harder bricks in lime mortar are irregular, and show, as might be anticipated, that piers in lime mortar cannot in any case be relied on to take heavy loads, the strength of the pier being limited by that of the mortar.

Before proceeding to compare the results with some figures from other sources, it is necessary to consider the effect of the ratio of height over least width on the relative strength of piers. It is obvious that the safe load on a cube of brickwork will be different to that on a slender pier; and, in comparing figures from various sources, some method—however approximate—is required for reducing them to a common basis in this respect. Some data on this point were obtained by the series of tests on brick piers of varying heights carried out at Watertown Arsenal, U.S., from 1883 to 1891, and summarized in Table III. The piers in Rosendale mortar were built of "common" bricks; the average ultimate compressive strength of the single bricks being 1,016 tons per square foot, and that of the mortar 161 lb. per square inch. The piers in lime mortar were built of "Bay State" bricks; the average ultimate compressive strength of the single bricks being 733 tons per square foot, and that of the mortar 124 lb. per square inch.

TABLE III.

Watertown Arsenal Tests on 12-in. by 12-in Brick Piers of varying heights.

Ratio of Height of Piers to least Width.	Ratio of Average ultimate Crushing Pressure of Piers to ditto of Single Bricks.	No. of Tests Made.
I. Piers in Rosendale Mortar.		
	Per cent.	
2·1	15·1	2
2·5	13·2	1
3·1	11·5	1
4·2	11·5	2
6·3	10·5	2
8·4	9·6	2
10·5	8·5	1
II. Piers in Lime Mortar.		
2·0	12·0	1
6·0	10·2	2
7·8	10·3	1
10·0	8·1	1
*15·0	8·2	1

* Pier, 12 in. by 8 in.

By plotting these results as in Fig. 2, an approximate curve can be obtained showing the comparative carrying power of piers having varying proportions of height to least width. Further information on the subject would be of value.

Very little reliable information is available as a check on the values of safe loads arrived at in Table II., but it may be useful to compare the figures for stock brickwork with those which are given in some commonly used works of reference. The figures are not taken as having any special authority, but as giving some indication of what may be assumed to be ordinary practice.

London Stocks in Lime Mortar.—Hurst's "Handbook" gives the load at which fracture commences, for piers of hard stocks in 1 to 2 mortar of grey chalk lime and sand, "height under twelve times least thickness," at six months, as 12 tons per square foot. It will be noted that this figure is for piers of height up to twelve times least thickness, as against four times in the case of the Royal Institute tests. Using the approximate ratio indicated above by Fig. 2, this

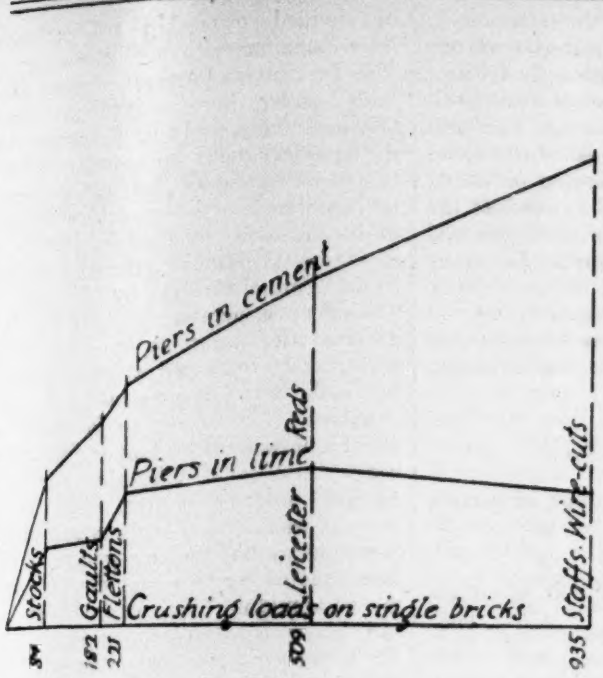

Fig. 1.

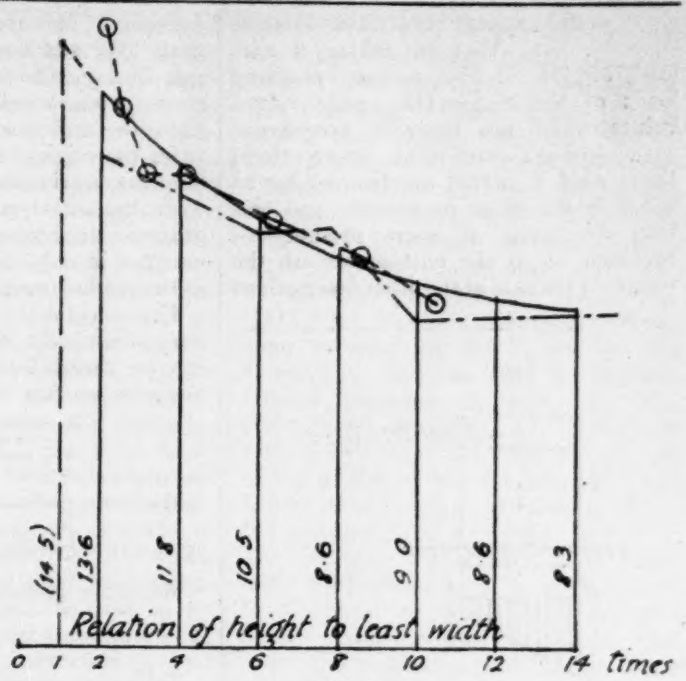

Fig. 2.

must be taken as being equivalent to $\frac{11{\cdot}8}{8{\cdot}6} \times 12$, or 16·46 tons per square foot for piers up to four times least width; and taking the factor of safety of $\frac{1}{5}$th of fracturing load, as recommended in the same "Handbook," a safe load of $\frac{16{\cdot}46}{5}$, or 3·29 tons per square foot, is arrived at.

The "Handbook" also gives, however, 3 tons per square foot as a safe load which has been used in the author's practice. The assumed relation of $\frac{\text{height}}{\text{least width}}$ is not mentioned, but if it is to be taken as being up to twelve times, the note that the figure was adopted "as it had to be remembered that the loads were to be sustained while the work was green" is not easy to understand, as in that case $\frac{1}{5}$th of the fracturing load would be only $\frac{12}{5}$, or 2·4 tons per square foot. The explanation perhaps is that the figure of 3 tons was for use in ordinary building work, where stock brick piers of height up to twelve times least width are not commonly met with. Hurst's "Handbook" would therefore appear to recommend a working load comparable with the Institute figures, of from 3 to 3·29 tons per square foot.

Volume III. of Messrs. Rivington's "Notes on Building Construction" gives particulars of tests on two 14-in. by 14-in. piers, 12 in. high, of common stocks in lime mortar, which commenced to fail at 17 and 21 tons per square foot respectively (average 19 tons per square foot). Taking the value of $\frac{\text{height}}{\text{least width}}$ as being approximately 1, and using the approximate ratios of Fig. 2 as before, the equivalent value for $\frac{\text{height}}{\text{least width}} = 4$ will be $\frac{11{\cdot}8}{14{\cdot}5} \times 19$, or 15·46 tons per square foot cracking load. This, with a factor of safety of $\frac{1}{5}$th, gives a safe load of $\frac{15{\cdot}46}{5}$, or 3·09 tons per square foot.

Volume IV. of the same work gives the cracking load on "good stock brickwork" in grey chalk lime mortar as 200 lb. per square inch, or 12·85 tons per square foot; and the safe resistance to compression of "brickwork" (apparently stocks) "in good mortar" as ·5 cwt. per square inch, or 3·6 tons per square foot; but as no particulars of $\frac{\text{height}}{\text{least width}}$ are given in either case, and no particulars as to the description of "good" mortar in the latter case, the information is too indefinite to be of much value. Taking, however, the figure for the cracking load, $\frac{12{\cdot}85}{5} = 2{\cdot}57$ tons per square foot safe load on brickwork of unspecified proportions.

London Stocks in Cement Mortar.—Hurst's "Handbook" gives the fracturing load for piers of "ordinary well-burnt London stocks" in 1 to 1 cement mortar, $\frac{\text{height}}{\text{least width}}$ not more than twelve, at three months, as 30 tons per square foot; and that for similar piers of "best quality hard stocks" as 40 tons per square foot. Taking the former figure (as representing ordinary conditions) and reducing to the standard basis, $\frac{11{\cdot}8}{8{\cdot}6} \times 30 = 41{\cdot}16$ tons per square foot, and $\frac{41{\cdot}16}{5} = 8{\cdot}23$ tons per square foot safe load. This, it should be noted, is for 1 to 1 mortar, in place of 4 to 1 as in the Institute piers.

In the same "Handbook" a figure of 10 tons per square foot is given as the safe load for "best stock brickwork" in 2 to 1 cement mortar. The assumed relation of height to width is not stated, but in any case the figure appears to be high, in view of the figures previously given for fracturing loads, and could only be used for an exceptional quality of stock.

Volume IV. of Rivington's "Notes" gives the cracking load on "good stock brickwork" in cement mortar at 700 lb. per square inch, or 45 tons per square foot and the safe resistance to compression of "brickwork" (apparently stocks) "in cement" as ·8 cwt. per square inch, or 5·76 tons per square foot. Particulars of the assumed relation of height to width are wanting, as in the case of stocks in lime; but taking $\frac{1}{5}$th of the cracking load, we get two values for the safe load of 5·76 and $\left(\frac{45}{5} =\right) 9$ tons per square foot on brickwork of unspecified proportions. Tabulating the figures:—

TABLE IV.

—	Institute Tests, Series III.	Hurst's "Handbook."	Rivington's "Notes."
Stocks in lime ...	2·85	3 to 3·29 Average, 3·14 Combined average, 2·98	2·57 to 3·09 Aver., 2·83
Stocks in cement	5·49	8·23 for 1 to 1 mortar; say, 7·0 for 4 to 1 Combined average, 7·19	5·76 to 9·0 Aver., 7·38

It will be seen that the value deduced from the Institute tests agrees fairly well with that obtained from other sources, in the case of stocks in lime; but is considerably below in the case of stocks in cement. It appears, however, to be open to question whether many structural designers would be prepared to load piers built of present-day London stocks, as ordinarily obtainable, in

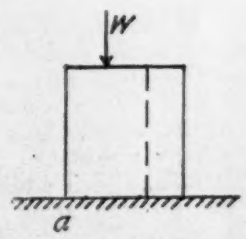

Fig. 3.

cement mortar, up to as much as 7 or 8 tons per square foot. Probably 3 tons per square foot for ordinary good stocks in lime mortar and 6 tons per square foot for the same in cement mortar, would approximately represent ordinary safe practice, these figures corresponding fairly closely with those deduced from the Institute tests.

C

It would appear that the method adopted, viz., that of taking a safe load of $\frac{1}{3}$th of the average cracking loads of the Series III. results, gives values which are fairly in accordance with (though somewhat lower than) those used in actual practice, so far as stock brickwork is concerned; and this may be taken as some presumptive evidence as to the reliableness of the results in the case of the other descriptions

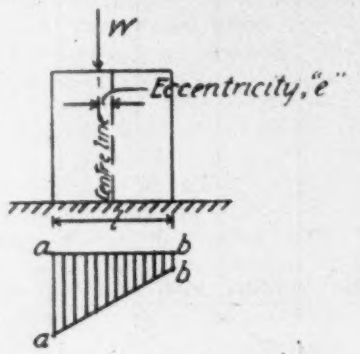

Fig. 4.

of brickwork, for which comparative data are less available. It should be noted that the values arrived at are directly applicable only to symmetrically loaded piers of height up to four times least width.

The following table gives for comparison the equivalent figures for a height of twelve times, based on the ratio indicated by Fig. 2 :—

TABLE V.

Institute Tests, Series III.

Description of Brickwork.	Safe Load at $\frac{1}{3}$th Fracturing Load.	
	Height four times least width.	Height twelve times least width (approximate equivalents).
	Tons per sq. ft.	Tons per sq. ft.
Stocks in lime mortar...	2·85	2·07
Stocks in cement mortar	5·49	4·00
Gaults in lime mortar ...	3·09	2·25
Gaults in cement mortar	7·45	5·43
Flettons in lime mortar	4·82	3·51
Flettons in cement mortar	8·78	6·40
Leicester reds in lime mortar	5·63	—
Leicester reds in cement mortar	12·47	9·08
Wire-cut blue Staffs. in lime mortar	4·82	—
Wire-cut blue Staffs in cement mortar.....	16·99	12·38

The case of unsymmetrical loads is one requiring some consideration. It is frequently assumed that a pier can be strengthened by an unsymmetrical addition to its width. This view is, however, usually a mistaken one. The usual effect of any such addition is to increase the pressure along the edge nearest the centre of gravity of the load while reducing the average pressure over the whole area of the pier.

For example, the intensity of pressure along the edge "*a*" of an unsymmetrically loaded pier (Fig. 3) is not only greater than it would be if the load W were central with the pier, but is also commonly greater than it would be if the pier were reduced as shown by the dotted line so as to bring it centrally under the load. The rule is, as stated by Professor Johnson ("Materials of Construction"), that "the addition of material on one side of a member subjected to a direct stress symmetrically placed weakens it until the added material has exceeded twice the original thickness of the member, the maximum weakening occurring when the added material is one-half the original thickness, when the enlarged member is only three-fourths as strong as the original member."

The incidence of pressure on an unsymmetrically loaded rectangular pier can be ascertained from the following formulæ (see Fig. 4) :—

W = load on pier.
e = eccentricity of load.
l = total width of pier.
A = area of pier.

Maximum pressure per unit of surface ($a - a$ in stress diagram) $= \frac{W}{A}\left(1+\frac{6 \cdot e}{l}\right)$.

Minimum pressure per unit of surface ($b - b$ in stress diagram) $= \frac{W}{A}\left(1-\frac{6 \cdot e}{l}\right)$.

Taking as an example the case where W acts at a distance of $\frac{1}{3}$rd of the width from one edge of the pier, the eccentricity "*e*" will be $\frac{1}{6}l$, and the maximum intensity of pressure will $= \frac{W}{A}\left(1+\frac{6 \times \frac{1}{6}l}{l}\right) = \frac{W}{A} \times 2$: *i.e.*, the maximum intensity in this case is twice what it would be with a symmetrically placed load; while the minimum intensity $\frac{W}{A}\left(1-\frac{6 \times \frac{1}{6}l}{l}\right) =$ Zero.

The maximum intensity *a*—*a* should, of course, not exceed the safe load per square foot on the brickwork in question, and it is often advantageous to use harder bricks on the side nearest to the load.

NOTES.

Coast Erosion. IN his evidence before the Royal Commission on Coast Erosion Colonel Stuart Wortley directed attention to the well-known but sometimes forgotten fact that the destruction of cliffs is frequently due less to the action of the sea than to the effects of land springs. In the vicinity of Highcliffe Castle large quantities of water formerly accumulated on the plateau on the cliffs, percolating through the gravel, and, saturating the undercliff, rendered the earth or rock incapable of supporting the material above. By the construction of drains the evil has been remedied, and Colonel Stuart Wortley estimates that if the work had been executed a century ago he would now possess additional land to the extent of three-quarters of a square mile. It is quite possible that in some places the water which helps the destructive action of the sea might be utilised for public or private supplies, and thus impart a more remunerative aspect to protection works.

The River Tyne Case. THE judgment of Mr. Justice Warrington, granting an injunction to restrain the Tyne Improvement Commissioners from dredging or deepening the bed of the river, as proposed, between the Tynemouth Corporation fish quays and the sea, illustrates anew the disadvantages of divided ownership and authority in connexion with public waterways. The Tynemouth Corporation quays were built under licence from the Tyne Commissioners, and must be removed if the latter body so request. But in the meantime access to them must not be interfered with—as evidence shows to be the case—by dredging operations in excess of powers conferred upon the Tyne Commissioners by Parliament. The effect of increased depth of water at Tynemouth seems to be that such disturbance is caused at the quays as to make it inconvenient and even dangerous for vessels to lie alongside for the purpose of loading or discharging cargo, and it is tolerably clear that further progress of the improvement scheme would make matters still worse. Notwithstanding his recognition of the fact that owing to recent developments in shipbuilding the improvement of the river is of great importance to all Tynesiders and the nation at large, Mr. Justice Warrington felt bound to grant the injunction. We do not see how he could avoid this course, for the Tynemouth Corporation were entitled to protection, and the Tyne Commissioners had clearly exceeded—and intended to exceed further—their statutory powers. Nevertheless, the improvement of the river must be continued, and it is possible that the present deadlock will be terminated during the present session by Parliamentary sanction for the increased depth of the Tyne.

Mining Rights and Waterworks. THE case of Manchester Corporation *v.* New Moss Colliery, Ltd., commented upon in the *Builder*, August 25, 1906, has been carried to the House of Lords, when the decision of the Court of Appeal, which reversed the judgment in the Chancery Division, has been affirmed. The case is one of some importance, and the point may shortly be stated as follows. The Corporation under their special Act had powers to purchase land by agreement but not compulsorily. Acting under these powers they acquired two pieces of land, one from Lord Stamford, of which the surface was only conveyed, and the right to work minerals without making compensation was retained; the other from Mr. Taylor, of which the surface and all mines and minerals were included in the conveyance. The waterworks were constructed on this latter piece of land, but the owner of the minerals under the other piece of land was working the minerals so as to cause damage to the waterworks, some of this damage being outside 40 yds. from the undertaking and some of it within the 40 yds. The justification relied upon by the defendants was the provisions of the Waterworks Clauses Act, 1847, as they had given notice under that Act before operating within the 40 yds. limit, and the plaintiff had given no counter-notice to treat. The House of Lords held that in the circumstances of this case, where the Corporation were owners of the one piece of land, including minerals, the Waterworks Clauses Act had no application to destroy the right of the Corporation to lateral support for that piece of land, and therefore that the defendants must be enjoined from causing damage

either within or without the 40 yds. limit.

Niagara Falls.

THE havoc and disfigurement already caused on both the American and Canadian portions of Niagara Falls are well known. Attempts are being made to repair the injury as far as practicable, but at the same time enterprising capitalists are busy planning fresh attacks. From a report by Dr. J. W. Spencer to the Geological Survey of Canada we learn that the project of the Ontario Power Company to use 40,000 cubic ft. of the water per second would destroy a large portion of the Horseshoe Fall, reducing its length from 4,000 ft. to 1,600 ft., breaking up the Fall on the American side into a series of small cascades. Moreover, it is pointed out that the existing rate of recession would be materially increased by the disturbance of rock at the base of the Fall, and that the effect on the level of the lakes above would probably be most inconvenient. If the basin above the upper rapids became lowered the level of water would be reduced in Lakes Erie, Huron, and Michigan, causing immense damage to harbours and canals upon or connected with those inland seas. Thus the problem of Niagara Falls is something more than an æsthetic question.

The Quebec Bridge Disaster.

THE Report of the Royal Commission appointed to investigate the causes of the Quebec Bridge failure confirms the opinion we have already expressed that the unit stresses taken as bases of computation were unjustifiably high, and that present knowledge concerning the action of steel columns under load is not sufficient for the design of structures like the Quebec Bridge without a large factor of safety. The Commission find, moreover, that a grave error was made by Mr. Szlapka, the designing engineer to the contractors, in underestimating the dead load, a mistake which, we are sorry to say, was accepted by Mr. Cooper, the consulting engineer. Although the details of the design were carefully set out and the workmanship as well as the material used were of good quality, the safety of the bridge was vitiated by fundamental errors on the part of the two engineers mentioned. The moral is that an experienced bridge engineer ought to have been appointed to prepare the designs and to superintend the construction and erection of the bridge from beginning to end, in accordance with British practice.

Fuel and its Future.

ON Monday evening last Professor Vivian B. Lewes delivered the first of a series of four lectures on "Fuel and its Future" before the Royal Society of Arts. The lecture consisted for the most part of an account of the formation of cellulose and its conversion into wood, peat, and coal. It was pointed out that in the natural formation of coal from vegetable matter the proportions of water, and of oxygen otherwise combined, gradually decrease, and the residue becomes, in consequence, richer in carbon and of greater calorific value. Professor Lewes expressed the opinion that peat is likely to be very largely used as a fuel in the immediate future, but this is a forecast with which we cannot agree, so far as English towns are concerned. In districts in which coal is scarce and peat is abundant dried peat may be used with advantage; but many attempts have been made to introduce dried compressed peat into England as a substitute for coal, and they have always failed. The failure is largely due to the character of the solid fuel left after the volatile hydrocarbons have been burned. In the case of coal a dense coke is obtained, but with peat the residue is a comparatively light charcoal. The coke is of much greater value for domestic fires and industrial furnaces than the peat charcoal. In Russia and Austria, in districts in which coal is expensive and in which large deposits of peat exist, the manufacture of peat gas and charcoal is, we believe, being conducted on a fairly large scale; but peat is, nevertheless, a poor substitute for coal.

Gas v. Electric Lighting.

IN the *Journal* of the Royal Sanitary Institute there is a valuable paper by Dr. Rideal giving the results of an inquiry into the hygienic effects of gas and electricity as used for domestic lighting. Three parallel lines of research were followed; the first into the direct hygienic effects of the two lights, the second into the indirect effects due to their products, and the third into the nature, amount, and distribution of those products. Three important conclusions of the author may be thus briefly summarised: (1) That, owing to the better ventilation obtained by gas, the products of combustion are not found in the air in anything like the proportion that might be expected, so that the temperature and humidity in an occupied room are no greater than when electric light is employed; (2) that heat, carbonic acid gas, and moisture so far as they affect health are derived more from the inmates of a room than from the illuminant; and (3) that medical views of the question are in accordance with conclusions derived from chemical and physical data, and demonstrate that the choice between the two systems of lighting does not depend upon hygienic considerations. The superior ventilating effect of gaslights is obviously responsible to a considerable extent for this favourable opinion of an illuminant which is intrinsically less desirable than electricity.

The Old Council Chamber, Guildhall.

THE City Lands Committee have formulated a report dealing with proposals for supplying additional accommodation at the Guildhall. Room is required for the staff who will carry out the provisions of the new statute relating to the union for administrative and assessment purposes of the City of London parishes. The project comprises a scheme for the erection of fresh offices which, if pursued, will involve the demolition of the old Council Chamber. The proposal has already aroused remonstrance and opposition, for the building possesses many interesting and historical associations. The chamber stands at the eastern corner of the northern block of the Corporation office buildings, and is entered from the lobby at the side of the Aldermen's Court Room. It replaced the Council Chamber built in 1613–4 in substitution of the first Council Chamber, which was erected, together with the old Court of King's Bench, and latterly of Exchequer, in 1424-5 for the Mayor's Court against the north side of the east part of the Great Hall (1411–30). Portions of those buildings were revealed in the course of the demolitions made in 1882 for the new Council Chamber on that site. The Old Council Chamber, now threatened with destruction, was built on the site of the garden of the then Town Clerk's house, after designs by George Dance the younger, City Architect, in 1776–7. The camerated apartment is of handsome proportions and is well lighted. It is oblong on plan, consisting of a middle portion with east and west bays, the middle portion having angle pilasters which carry four semicircular arches, with pendentives, which support the rounded ceiling; the east and west arches open into the bays. Since the opening of the present Council Chamber in 1884 the Old Council Chamber has been adapted for the sittings of the Mayor's Court, presided over by the Recorder and the Common Sergeant, and of the Coroner's Court. Amongst the marble busts is one of J. B. Bunning, City Architect and Surveyor, by Durham, 1874; there are portraits of George III. (by Ramsay), and by Joseph M. Wright, of some of the judges who settled, in Clifford's Inn Hall, the claims and disputes which arose during the rebuilding of the City after the Great Fire.

The Shakspeare Memorial.

THE site proposed for the Shakspeare memorial, in a cleared space cut out of the Park-square-garden, at the end of the central vista up Portland-place, is a very fine one, and a monument worthy of the occasion ought to have a great effect in such a situation. The idea of continuing the Broad-walk of Regent's Park through the Park-square-garden to the head of Portland-place would no doubt have made a fine prolongation of the axis of Portland-place, and would have saved the detour by the crescent road, but it would have completely spoiled the Park-square-garden for purposes of enjoyment and comparative privacy, and we prefer that it should have been abandoned.

Park-crescent and Park-square.

PARK-CRESCENT and Park-square, with their gardens, which will thus become the environment of the Shakspeare memorial, were designed and planned by Nash; a tunnel beneath Marylebone (formerly New) road connects the two gardens. The theatre and rotating saloon in Park-square East, erected by Nash, Morgan, and A. Pugin for Bouton and Daguerre's Diorama, was opened in September, 1823, and converted in 1855 into a Baptist chapel for Sir Samuel M. Peto by John Thomas. Nash's scheme for laying out the Crown lands of Marylebone Park, with the Farm and Fields, begun in 1812, and for which his former pupil, James Morgan, acted as civil engineer, originally provided for an extension of

Portland-place to the contemplated royal palace in Regent's Park, and having detached villas along each side of the approach road; but that idea was relinquished in favour of the Broad-walk with entrance gates, north and south, in the Outer-circle, and crossing Chester-road.

The Hellenic Society.

MISS LOWTHIAN BELL'S lecture on "Early Christian Architecture in the Karadagh," at the Hellenic Society's meeting on Tuesday, was not only, in regard to clearness of arrangement and charm of delivery, one of the most brilliant lectures we have heard there, but was of real value as a contribution to architectural history, bringing before us descriptions and illustrations of a group of ancient Byzantine remains which are little known. The Karadagh is a mountain, or a mountainous region, of Asia Minor, a little to the north of the Taurus range. Among these hills are various remains of very early Byzantine churches, all more or less ruined, but many of them in sufficient preservation to enable their architectural character to be studied and understood, and which represent some of the very earliest beginnings of Byzantine architecture. The plans are mostly in complete or incipient cross form, some few of the very oldest in basilica form; and they may be classed, as to sectional design, under two heads—those which have the low aisle and clear-story, and those in which the aisles are nearly the same height as the nave, and in which consequently the nave has no clearstory; these Miss Bell, translating or adapting a German nomenclature, distinguished as "barn churches." The various plans exhibited presented some curious varieties of early planning, and one or two of the churches showed the early application of the clumsy rough-and-ready manner of planting a dome on a square substructure, by corbelling out on a course of stone placed across the angle to receive other courses which complete the transference from square to circular plan. There were some examples of early squinch arching also for the same purpose. We agree with Miss Bell in considering that the corbelling system is the older; the squinch was a subsequent attempt to solve the problem in a neater and more scientific manner. Attention was drawn also to the peculiar but simple and primitive mouldings to be found in these churches, one of which is an obvious corruption of the classic *cyma*, but with a curious droop of the lower convex portion of the curve. Miss Bell is a thorough mistress of her subject, and spoke with the knowledge and precision of a trained architect.

Architecture in a Mist.

M. LE SIDANER, the clever French painter who has made a manner of his own in the treatment of building subjects as if seen in twilight and through a haze, has a small series of paintings at the Goupil Gallery illustrating "Hampton Court and London." The aspects which some familiar buildings take under his treatment are rather peculiar and unexpected. The red brick front of Hampton Court Palace, under "the sun's last rays," makes a powerful piece of colour, and we can quite imagine the old brick-work taking on so strong a red with a level sun striking on it; but it would be just as effective if there were some appearance of the texture of brickwork, instead of looking as if it were built of, let us say, red toffee. The east front of the palace, under the morning sun, is better, and there is a fine effect in the picture of the "Fountain Court at Sundown," seen in half twilight. But the large painting of St. Paul's is about the worst picture of St. Paul's we have ever seen; not only is the architecture reduced to a sort of woolly confusion, but the whole proportions and design of the dome are wrong. Of course the painter would say he was not painting architecture but an effect; but if painters will take great buildings for subjects, they should at least try to get their main lines right.

Architectural Study in Rome.

ARCHITECTURAL students who are visiting Rome would probably find their work facilitated by communicating with the Director or the Secretary of the British School at Rome, at the Palazzo Odescalchi. The School can obtain for English students free permits to visit buildings for sketching and measuring; one student, for instance, has recently been working in the Palazzo Massimo, of which he has had the free run for a month. The Committee can admit, as students of the British School at Rome, holders of travelling fellowships, studentships or scholarships at any University in the British Empire; travelling students sent out by the Royal Academy, the Royal Institute of British Architects, and other similar bodies; or other persons who shall satisfy the Committee that they are duly qualified to be admitted as students of the School. Those so admitted are expected to pursue some definite course of study or research, and to submit to the Director in each season a Report upon their work for the information of the Committee.

THE ARCHITECTURAL ASSOCIATION.

AN ordinary general meeting of the Architectural Association was held on Friday evening last week at No. 18, Tufton-street, S.W., the President, Mr. Walter Cave, in the chair.

Mr. C. Wontner Smith, Hon. Secretary, having read the minutes of the last meeting, which were confirmed, and seven nominations, he announced a visit on the 14th inst. to the London, Edinburgh, and Glasgow Assurance Building, Euston-square, Euston-road, N.W., by permission of the architect, Professor Beresford Pite. Members to meet at the building at 2.30 p.m. He also made the following announcements:—Visit on March 21 to the Associated Portland Cement Manufacturers, Ltd., works Swanscombe-on-Thames. Full particulars are announced in the *Journal* for March. Annual dinner on Thursday, April 9, at 7 p.m., to be held at the Georgian Hall, Gaiety Restaurant. Tickets, price five shillings each. Camera and Sketching Club meeting on March 19. Paper by Mr. Edwin Gunn on "Timber, Brick, and Plaster in the Eastern Counties," at 8 p.m.

Water-colour Painting for Architects.

Mr. W. J. L. Horsman having been elected a member, Mr. P. L. Forbes read the following paper on "Water-colour Painting for Architects":—

Preface.

"Since writing the following paper on "Water-colour Painting" I have felt the necessity of putting a short preface to it explaining its purport.

The title given to me was "Water-colour Drawing for Architects," which I have had the temerity to alter to "Water-colour Painting for Architects," my reason being given in the paper. Now this title implies *that* I should endeavour to point out to the members of the Architectural Association the advisability of their having a knowledge of this branch of the Arts and the use it would be to them, *that* the busy bees in the Garden of Arts should not confine themselves to sucking the honey from one species of flower (the species, I grant, from which they either obtain or are about to obtain their life's nourishment), but should dip into another and so increase the range of their taste and add a second course to their meals—let us say the pudding to the roast beef. Therefore, my paper is an attempt to describe the sweet flavour of the honey of this other flower, and various steps to be taken so as to obtain it to the best advantage. I do not presume to address those who are already proficient in the noble art of water-colour painting, as many of you I know are, for most likely I should be trying to instruct men who know more about it than I do myself; I merely ask them, if there are any here, to bear patiently with me, and perhaps to indulge in picking me to pieces afterwards, which will be beneficial to myself. This paper then is written with the idea of inducing those who, either have never taken up water-colour painting, or have only got a slight smattering of it, to take it up, or to go on with it, and so I have touched upon some of the principal items to be gone into for the making of a sketch or picture—items which after some thought and study will lose the sense of drudgery, always attendant upon beginnings, and will become instincts, making the practice of the Art an exquisite pleasure, and a splendid relaxation after the T-square and eighth-inch scale of the office.

I have begun this paper in the month of September, 1907, having just returned from six weeks hard sketching in Norfolk, because my mind is full of the beauties of Nature, full of the recollections of the glories of earth, sea and sky. I have been studying her in all her varied moods—in the laughter of her sunshine on the breezy ocean beneath a blue sky dappled with fleecy clouds, the white horses dancing in the light, from as far as the eye can reach up to the pebbly shore, where, in their hurry to be first on land, they tumble over each other, foaming as they go; in her majestic mood, when, on the day following a thunderstorm, the great cloud chariots pass in stately procession like a victorious army marching homeward with all its panoply of war; in the sombre quietude of her grey day, when the yellow of the corn-fields tells out against the dark greens of the hedges and trees; or in her silvery aspect when myriads of angel faces hang in the morning sky and a gauze-like vapour envelopes the landscape; and in the magnificent splendour of her sunsets, the great curtains of gold and purple hanging over the couch of the retiring monarch of day, when 'the heavens are telling the glory of the Lord.' . . . 'Why,' I can hear my audience asking, 'does he begin like this? What has this multifarious description of Nature's moods got to do with the title of the paper, "Water-colour Drawing for Architects"?' Just as the purpose of the prologue to a play is to gain the sympathy of the audience, so my feeble attempt to describe a few of Nature's phases is to elicit your sympathy with my enthusiasm for the subject I am about to treat of.

Water-colour not "Drawing."

Before touching upon the various items that have to be considered in the making of a water-colour, I regret that I must first quarrel with the title given to me for this paper. I contend that 'drawings' is not the proper name to give to water-colours of the present day. It was correct for pictures done before and during the earlier period of Turner's life, for then the method was, after the outline had been drawn in, to shade up with Indian ink or brown, and finally to put faint washes of blue, yellow, red, green and brown over the whole, so that the strength of the drawing was not obtained by the colour, but by the darks which had been put in underneath. It is, however, a very different matter nowadays when the whole painting from highest light to deepest dark is put in in colour, and many water-colours will hold their own in depth of tone and richness of colour with pictures painted in oils; therefore water-colours, if they require an additional word, should be called water-colour paintings.

Nature.

To be on intimate terms with Dame Nature, delighting not only in her grace of form, but also in the beauty of her colour, is to have a lasting and an ever-present friend, a friend who is always teaching you something new, and of whose society you never tire, for the more you study her the more you desire to know of her, the more you learn of her the more you feel there is to learn, and the importance of this study to the architect cannot, in my opinion, be over-estimated as it will teach him harmony in tones—most necessary knowledge in the decoration of buildings, for nature is never out of harmony one part with another; would I could say the same for the devices of man, which we sometimes see, alas! often sorely out of keeping with their surroundings.

This study will teach you that nothing that Nature does is gaudy or garish; she can be brilliant in the sparkle of her sunshine and shade, richly mellow in her evening glow, dark and lowering in her angry moods, but never gaudy. There was last June near my studio a large poster on a hoarding, most gaudy in itself, a Reckitt's blue sky in which floated a crudely-yellow airship, a fearful bill to look at; but one sunny day it was to me one of the most beautiful bits of colouring I have ever seen, for, through a large spray of May blossom above it the sun was shining, casting cool pearly shadows over it, and the otherwise garish mass scintillated with beautiful colour, and why? Because the half-tones, or in other words the greys, gave value to the lights; therefore a picture to be beautiful and brilliant should be permeated with greys to give value to its lights and more positive colour, and it is only by the close study of Nature that one can learn the shades of her tones, and the tones of her shades.

The Sense of Colour.

It is through this study alone that a man will become a good colourist; he must, however, have a sense of colour, a feeling for the beautiful in colour born in him—you cannot make a good colourist out of one who has no sense of colour. It is very different with drawing—anyone can become a good and correct draughtsman by a sufficient amount of application and hard work, some more, some less, of course, but a colourist must have the germs of colour in him, no amount of inoculations will produce the sense if it is not there beforehand. But, again, the man possessing that sense may have it utterly destroyed by living with bad colour. Here I must put in, that a pupil can be taught to see things rightly or wrongly; some learn to see trees and grass a sort of emerald green, as I shall relate later on, so I advise him, firstly, to get put in the way of the right pigments and tools to use, and then to obtain some instruction as to how to use them, for by so doing he will save no end of time and vexation of spirit; finally, having gained a certain amount of technical skill, let him go and study from Nature herself. Let him copy her, at first, most carefully as to her masses, her tones and her values, choosing simple subjects and effects, and working up gradually until he is able to paint her in all the richness of her ball-room attire; but let him not begin by trying to tackle her in gay costume, for it will surely end in failure and downheartedness. A terrible feeling comes over me sometimes, that my sense of colour is being ruined when I cast my eyes upon the things in German gilt frames which one often comes across in farm-houses, yea, and even in the houses of those who ought to know better. Do not be disheartened because I have said that a man must be born with a feeling for colour, and say to yourselves 'We fear that we have not been born that way, so there is no use in our trying,' that is how our forefathers used to look at the doctrine of presdestination. No man knows what he is capable of until he tries and tries hard, too. I'll tell you one method of finding out. Take walks, in the country or in this great city, I care not which, with a colour enthusiast, try to enter into his feelings, egg him on to point out to you the beauties in colour that lie around and above, and if you feel some of his enthusiasm beginning to work in you, then know that surely the goddess is within you, she has been awakened, and begins to long for that food which her long sleep has deprived her of: nourish her, educate her, it is well worth your while, for she will stay with you all your life, and will ever be a source of boundless pleasure to you. I believe that there are many here to-night who are as yet quite unaware of the beauteous creature that lies dormant within them. But there is another incentive to architects to practise water-colours, and it is this, that your ancestors in the great profession used to do so in the beginning of the XVIIIth century before the painters took it up; it is therefore your hereditary birthright. When Paul Sandby, who is justly called the father of English water-colour painting, was born in 1725, the art of tinting drawings with washes of transparent colour was generally practised by architectural draughtsmen. What Sandby did was to carry the tentative methods of contemporaries further than they perhaps thought it possible, but had he not seen these tentative methods, is it not possible that he might never have been induced to go further and so had never earned the title of father, and if architects painted in water-colours before him, are they not the true fathers of this distinctly English art? Here therefore, I take it, is a tremendous inducement to you architects to take up and excel in this most beautiful and delicate branch of the arts.

Requisites of a Picture.

Trusting that the foregoing remarks have worked up my audience to a state of enthusiasm for the subject, I will now proceed to touch upon the various things necessary for the making of a picture, and there are a good many besides colour. The first and all-important is *Good Drawing*; this, I have said, any one can attain to by hard work. A picture, if the drawing be good, will look well even though the colouring be inferior, but no amount of beautiful colour will redeem one that is badly drawn. Then there comes *Composition*. Here again colour is powerless to put right a badly composed scene, though it may modify its badness; therefore I strongly advise those wishing to become picture makers to go to good exhibitions, select the best works, not always on the line however, and try to analyse them, asking themselves why they are good, for the composition must be good or the picture would not; why, for instance, in a certain picture that cart and horse are placed there and going in that direction, why these trees are on the left and that great white cloud on the right. And after having studied it thoroughly, let them go home and try to make a memory sketch of it in black and white. The composing of that picture has cost the artist no end of thought, and is therefore well worth their study.

The third item in my list of things to be studied in picture building has a large and broad-sounding name, and must be used in a like manner, namely, *Chiaroscuro*, which Nuttall's Dictionary tells us means "clear obscure" (rather like the weather charts in the daily papers—"fine, some rain"), or in plain English, light and shade. Before beginning a sketch always settle in your mind which parts will be best in shade and which in light, and having so settled, keep to your arrangement; do not be moved by cloud shadows falling on various parts at different times and try to alter what you have done, or the result will most likely be mud. Should you be convinced that after all another effect than that which you had determined upon would be more pleasing, begin another sketch, or, if time will not allow of this, make a note of the better arrangement, so that you can if you wish paint it afterwards. Here again the study of good pictures will greatly help you. Let your masses of light and of shade be broad; do not have lights dotted all over the picture or you will get a spotty, jumpy appearance. Even in the most elaborately detailed picture the details in the shadows must be contained in and subservient to the broad shadow, and in the lights the details must be the same—that is, the darker parts in the light mass must not be so obtrusive as to break the continuity of the effect. It is by the judicious use of chiaroscuro that it is possible to render insignificant a portion of the landscape that is ugly, or bring into prominence the beauties which you wish to emphasise. If, for instance, you are given a commission to paint a certain house and grounds from a certain point of view, in which there are some ugly features, and you dare not leave anything out or cook the scene, as Turner used to do, in fact allowed no artistic license, for fear of incurring the wrath of your client and probably the loss of your commission, you can by the judicious use of light and shade subdue and quiet down the objectionable parts so that they do not tell in the general effect, and have to be looked for before it is seen that they are there. On sunless days the lights and shades in a picture depend much more upon the tone and colour of the masses, as no positive shadows are cast, but still you will find them in and under the objects, though of less degree.

Relative Values.

In the fourth place let us consider the *Relative Values* of the objects in a picture, that is their relation to each other as to lightness and darkness. Let us put colour for the time being out of our minds, and look upon the subject which we wish to paint as if it were to be done in black and white. Let us take a landscape all in shade, kept so on purpose that the finely clouded sky with the sun high up behind the big tawny clouds may shine in its lights which become brighter as they near the orb of day. In the foreground is a disused brickfield, full of long grasses, docks, and tanzies, with a broken path passing through it. The bits of the path showing among the grasses are lightest in the landscape excepting a white cow, to be mentioned anon (we are not discussing the sky just now), the tufts of long, dead grasses come next in lightness among which the green of the tanzie leaves are darker, the yellow flowers being light; on the right behind this comes a pit from which the clay has been dug, the sides of this tell as a light compared with the grass round the edges. Out of the bank at the extreme right grow some rugged bushes which stand up against the sky and are darker than anything we have described before. Among the tawny grasses graze a few cattle, two or three brown and a white

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cow; the brown ones tell as darks, and the white one reflects the bright light from the sky from off its back, which is therefore the lightest spot in the landscape. This cow is useful in carrying down the light from the sky. Separating this portion of the picture from a cornfield is a low, broken hedge with a gate in it, the hedge is not so dark as the bushes, and the yellow cornfield seen through the breaks in the hedge is lighter than all but the cow, the dead grass tufts, and the path in the foreground; behind the field in the further middle distance is a belt of trees broken on the right so that the blue hills beyond are seen; these trees are the darkest objects in the picture, and standing up against the sky help greatly to make the latter shine by the contrast; they also throw the sky back into the distance. The hills in the extreme distance are dark also, but the depth of the atmosphere between the spectator and them makes them less dark than the trees. It is capital practice to do black and white sketching with Rowney's blue-black, the finest pigment I know for the purpose, as it is always transparent, however thickly you may lay it on. Simply sketch for values, it will greatly improve your feeling for them. There are several ways of finding the relative values of objects; one is to bend down and look at the view through your legs, a not very elegant position, and calculated to cause onlookers to doubt your sanity, but a very useful method, as you look at the objects from an unaccustomed position, but the most useful way is to look at the scene with half-closed eyelids through your eyelashes; all the fussy little details will then be eliminated and the general masses only will appear, and do not try to paint more than you can thus see through the half-closed eyelids. Never attempt to paint every leaf on a tree (unless of course it is a study of a branch in the foreground) for the reduction in size is so great that even if you covered the space the tree occupies with pin pricks, each prick would be bigger than a leaf. Let the texture you put into your work suggest the foliage. A friend of mine once came upon a man using opera glasses for his work. "Why do you use these?" he enquired, pointing to the glasses. "Oh, replied the man, "because I cannot otherwise see the objects in the distance." "Then why on earth put them in if you cannot see them with the naked eye?" was the common-sense remark of my friend.

The Colours We See.

In sketching there is one thing I wish particularly to impress upon those who have not done much of it, or who are bothered by—shall I call them—nursery traditions, such as: the sky and the sea are blue, the grass is green, bricks are red, etc., and that is to get rid of these preconceived notions from your minds and paint the colours you see. There is nothing so fatal to good colouring as to possess and cling to these ideas. I once had a lady pupil who had come straight from Paris, where she had been studying flower painting in the most approved Parisian method. Her box was a marvel of brilliant pigments, which might have been valuable for painting canal barges and circus cars, but, for landscape, utterly useless—emerald greens of various intensities, Prussian blues, scarlets, and others far beyond those in the spectrum. For the first lesson, I took her to a spot where there was an old oak tree in the near foreground, some old farm buildings, a road, and hills in the distance. When I have a private pupil I generally work at the same subject beside him or her, doing a bit first, the pupil watching, and then trying on their own block to do likewise, and so on. In due course we came to the oak tree, through which the sun was shining. I began painting the tree by putting in the sunlight with raw sienna and a little cobalt, when she exclaimed in broken English, for she was a Swiss, 'Oh, you do make it a brown but the tree is green!' I explained that when I put in the half-tones and darks, the effect of the sun shining through the tree would be obtained. She, however, stuck to it that the tree was green, and said, '*I* will paint it green.' Pupils often learn best by being allowed to err and then, having their error pointed out, they are convinced, so I said, 'Very well, then, you do it your way and I will do it mine, and we will see in the end who will do it best.' I felt quite like Elijah with the prophets of Baal. So off we went, she her way and I mine, neither of us looking at the other's work for full twenty minutes. Then I heard a sigh. 'What is it?' I inquired. 'Oh,' was the answer, 'yours is nice, mine a mess!' I looked, and beheld an elliptical object the colour of brimstone and treacle. She had used emerald green, and, having put brown on the top, had stirred it about. She was convinced, and ever after followed my instructions to the letter. But, to go back to what I have called nursery traditions; atmospheric conditions, the position of the sun, juxtaposition, etc., etc., all affect the colour of objects. The sky may appear pink, green, slate colour, etc., not to mention the many tones of the clouds. Grass may seem yellow, green, bluish or even red, and I have seen purple trees in the evening light. Bricks, slates and tiles take on (thank goodness) the most beautiful colours through age and the growth of mosses on them, and the sea can assume all the colours of the rainbow.

'I have seen her dark as midnight 'neath a thunderladen sky;
I have seen her blue as sapphire when no trace of cloud was nigh;
I have seen her grey, green, yellow, with a fringe of creamy light,
Like an iridescent opal in a band of ivory white.'

'What I have been trying to impress upon you is this, get rid of what you think you ought to see, and paint what you actually do see, which in other words is, study ærial perspective—the colour of objects seen through the atmosphere. The further away the object, the more atmosphere is between you and it; and also light shining through the atmosphere affects the tones of these objects. Constable pointed out that painters should not think that the sky terminates at the horizon, but should realise that it comes all through the picture.* My rule is, if possible, not to work more than one sitting on the colour effect of a sketch; pencil sketches if necessary may be made of details to be filled in afterwards, but the atmospheric conditions are seldom the same for two days running in this glorious climate of ours. I am referring to outdoor sketching, of course; indoor studies can be made of objects at your leisure. It is, of course, quite impossible to lay down rules as to what colours to use for objects at various distances, as you will have gathered from the foregoing remarks, but I can give you these few hints. For extreme distances use as few colours as possible, cobalt—atmosphere, being very much mixed with them, the middle distance is more positive and contains slightly stronger tints; in the foreground and near distance the full strength of the colour-box comes into play, but experience alone can teach how to depict the manifold varieties of dame Nature. In painting trees in the foreground it is as well to make an outline of the skeleton so that the masses of foliage may look as if they hung from possible branches even though these be hidden; do not try to paint more than the principal masses, putting in the lighter parts first and running in the darks as far as possible while the lighter parts are still wet. Try to paint full strength at once, getting a broad idea of the relative values, and do not put your foliage all on one side of the stem, or make the branches which do appear like umbrella spokes.

Skies.

A landscape without a good sky is only half—and often less than half—a picture. How often do we see an otherwise good picture quite spoilt by the careless way the sky has been treated—like the world before the creation, without form and void. Many landscape artists do not study the sky as they ought to, thinking that anything will do. And here I would like to pay a tribute to my dear friend and your former water-colour instructor, Mr. A. W. Weedon, R.I. In my estimation he is the finest painter of skies we have ever had; no matter what kind of sky it was he could tackle it and give it a vapoury atmospheric appearance only beaten by Nature herself. He revelled in clouds and modelled them with a loving hand. You could almost see them driving before the wind in great dark masses, or advancing towards you in huge, built-up piles, or again lying in streaks in the mellow heat of a summer afternoon. Years ago, whenever the Royal Institute opened, I used to go and make straight for Weedon's skies, they were a revelation to me. It is only in water-colours that the fine watery effect of the clouds can be given, for skies in oils always suggest paint. There is just as much drawing and perspective in skies as there is in landscape, and the dealing with them requires much more subtilty.

You will find in some books on water-colour painting that the way to put in the sky is to put the blue in first leaving white spaces for the larger clouds; but that, in my opinion and experience, is putting the cart before the horse, and I think you will find the following method far the most satisfactory, and that is—having blocked in your clouds lightly with charcoal or pencil, paying particular attention to the composition with regard to the landscape, run in the lightest tones, then the shadow sides and underneaths of your biggest mass first, often at the top of your paper because the clouds highest up are nearer and therefore appear larger; then in a similar manner treat the lower ones, which grow smaller and smaller till they reach to near the horizon, which in a clouded sky is best kept broad and simple, and finally put in your blue. By so doing, the effect suddenly bursts upon you, and the pleasure this gives puts new life into you, and you are in a good humour for tackling the landscape. In sketching, never be in too great a hurry to get your effect; for, as long as you know that you are preparing for it, so long your interest will be kept up, and you work on knowing that the strength marks, which will make your picture shine, are yet to come. Suppose, for instance, that in a play the climax came in the first act, nobody would stay for the rest because the chief interest was over; so in painting skies, keep your blue for the final act, excepting, of course, the toning down of lesser lights and the general pulling together. In the construction of a clouded sky you will notice that generally the clouds at the top of your picture will have their undersides more or less in diagonal lines, and that the nearer they approach the horizon the more parallel they become; this is, of course, a very general statement, there being so many kinds of skies, but I wish to draw your attention to it. To me a sky of cumulus clouds is the most fascinating. Look at that grand pile towering up into the empyrean with its side of dazzling white turned towards the sun rounding off in multitudinous rolls into the deep blue grey of the portion in shade, which again is full of billowy undulations. See how its dark underside goes back and back till it reaches the tops of lower and more distant cloud mountains. In these latter notice how the lights are lower and yellower in tone and the shades more blue. Underneath them again come yet more, appearing far less in size owing to their distance, and their lights are still lower and reddish in tone, and so on till at length all form is lost in the blue grey of the horizon. Such an amount of drawing to be done, and how short a time to do it in, for you have scarcely mixed your colours and looked up before the great

* G. Clausen, A.R.A., six lectures on painting.

skyscape has completely changed. A breath of air has passed across the highest summits and spread them out like a great snowy plain. Babylon the great has fallen and your opportunity is gone. The only chance of success lies in the dexterity of your draughtsmanship and the retentiveness of your memory. Therefore block in your principal masses as quickly as possible and blot them in full strength at once, never messing back into what you have done, but going straight on until the whole is finished. The great secret of success in sky painting is the being able to draw with the brush, having the same power over and freedom with it as you would with charcoal or soft pencil. In all cases make it evident in your sky where the light comes from and give meaning to the clouds, whence they come and whither they go.

Use of Materials.

To those about to begin the study of water-colour painting, I should like to say: Begin by trying to use your colours and brushes indoors. Practise, first, putting a plain, even tint all over a small sheet of paper, using the brush full and laying the whole of it on the paper, never niggling with the point unless for finally filling up a hole that may have been left. Begin at the left-hand top corner and carry the colour right across the paper. Start again just underneath what you have put on with another full brush, picking up the edge of the last wash and so on to the bottom. Then try a graduated wash, having, say, blue in one well of your box, yellow in another, and red in the third. Begin with the blue, and when a third down the paper dip the brush with blue still in it into the yellow, next wash will be yellow, pure; when two-thirds down dip into the red, and end up with pure red. Always lift the brush at the end of the stroke with a sort of continuous motion, which has the effect of carrying the colour with the brush, thus preventing blobs. It is most important to practise the 'lifting brush,' as I have named this operation, which means never to lift the brush up straight, but with a movement continuing the stroke with which the wash was laid on. This method will save no end of trouble and time spent in removing blobs, which are the sorrow of the tyro. Having become fairly proficient in the laying on of washes, try some simple still-life studies, such as two or three apples in a plate on a table and a plain dark background. The drawing being done, try to model the apples with the brush, putting on the light side first and running in the colours and shadow sides as far as possible while all is wet. The practice of drawing and modelling with the brush is all-important in water-colour painting and the more deft at it that one becomes the more telling and crisp will be the sketches.

Out-door Sketching.

After having gone through this preparation, an outdoor sketch may be attempted, and with a far greater chance of success. Choose as simple a subject as you possibly can find having a strong black and white effect, such as a clump of trees for the dark with a white cloud behind for the light, or a white cottage with dark trees behind. Take the dark trees and white cloud, a plain grass field under the trees coming right into the foreground with a road through it coming towards you, and blue hills in the distance. Begin with the cloud, putting in only what is actually necessary, leaving out all the thousand and one little markings, making only for the broad effect of light and shade, and finally, as to the sky, put in the blue round the top of the great white mass. Now you will not get the light into your cloud until the whole of your paper has been covered, so run in the trees full strength at once in broad masses of light and shade, the lights in dark objects like trees in full foliage being darker than the most of the dark in the cloud. Next, lay on the grass in one broad graduated wash, noticing that the colour is less positive under the trees and becoming richer in tone as you approach the foreground. Let the edges of the grass along the road be broken. Then tint in the road, greyer in the distance, and lastly put in your belt of blue-grey hills. A few dark touches on the grass, a slight suggestion of ruts in the road and darks at the broken edges should complete your sketch. All this should be done without once messing back into any part of it. A good thing to do when you get home or as soon after as possible is to paint another picture from this, improving where you feel that you have failed. In painting buildings, lay over the walls the general effect of the broken tones, drawing in with your brush the suggestions of the stones or brickwork afterwards. The same method applies to roofs. Put on the shades and shadows last of all. Be sure that you put on the shadows all at the same time, so that they all go in the proper direction. I once saw the sketch of a town done from a window; it had been begun in the morning, and continued in the afternoon and evening. The shadows of chimneys, etc., on the houses had been put on as each house was painted, so that in the finished sketch they radiated like the spokes of a wheel. This of course was an extremely amateur case, but I mention it to show how necessary it is to put in the shadows all at the same time as far as possible. You all know better than I do the construction of windows and doors, so that it is quite superfluous to say anything about the putting of them in except this—be sure and put them in, however slightly, with a suggestion of their construction, for here again I have seen many an architectural subject spoilt by the poor way they were treated. In saying this I do not mean to suggest that your drawing should in any way be what is called 'tight'—loose-handling and freedom of touch is everything in painting. But do not, for instance, put in all the sash bars with a hard, black line; lose some of them, especially if rather distant, so that your picture may be atmospheric. Years ago, I showed a water-colour of a village street, which I had done, to an eminent old architect; he made no remarks about the foreground houses or those in the middle distance, but, pointing to a tiny lattice window, about an eighth of an inch in size, which I had suggested in a distant cottage, he said, 'Mr. Forbes, that window would never shut!' (I had drawn it open.)

Figures in Landscape.

To place a figure in a landscape, so that it appears to be just where it ought to, is not at all an easy matter. And, also, what queer things some of these figures are when placed! The heads either too big or too small, oftener too big, the brims of their hats projecting two or three feet all round, the bodies square and stumpy, and the legs all over the place. Every sketcher ought to have a note-book and make jottings of figures. If the figure is standing, make an oblong in the proportion of height to breadth and put it into it; at any rate it is a good plan at first to block in the space for the figure with straight lines. It is also a difficult matter to place one correctly in a sketch unless you have it actually before you on the spot where it is required. What I do is this—when a person comes to the place where I want my figure to be, I draw a line where the top of the head comes and another just under the feet, and then, as it most likely passes out of the place immediately, I draw it in at my leisure. The same applies also to horses or cattle. I once saw a picture by a professional artist where the figures had evidently been put in afterwards, without the precaution I have mentioned above. He seemed to have quite forgotten that his eye-line came three or four feet above the ground-line of the building opposite to him as he sat, and, therefore, that the head of the man would be above that line, and had put in the whole of the man and the donkey he was driving below the ground-line of the house; the effect, of course, was most ludicrous. Figures, even though quite small, on account of their representing life, have great weight in a composition; and, therefore, care should be taken in the drawing and the placing of them.

I have touched upon some of the principal points in picture making, and trust that their enumeration will not cause anyone, who had thought of taking up this delightful study of water-colour painting, to determine not to do so because there are so many things to be thought about; but rather that, perceiving that there are these many things to be studied, he will say to himself, 'I see that sketching and painting require brains and therefore I shall certainly tackle them.' Yes, brains are required for every touch, every stroke of the brush. Many a time has it been said to me, 'How delightful your life must be, all amusement; you go out to some beautiful spot and sketch it—I only wish I could.' 'It *is* delightful,' I reply, but I always feel that the speaker has not the vestige of an idea that the doing of the sketch requires even more concentration than counting the courses in a tall brick tower or totting up figures in a ledger.

Everything we do requires more or less work of the brain, and the way to rest it is to give it variety of occupation. And I know from former experience that there is no finer rest from the routine of office work than to set off into the country, box, sketching block, seat, and easel in hand; sit down, when you have found something that you cannot resist; fill and light your pipe and begin, feeling that there is no hurry, eternity is before you, and that you are going to make a jolly good sketch. Now, as to this jolly good sketch, be not, in a prosy manner, content to make an exact copy of the subject in drawing and colour, but try to put some poetry into it. Let there be a rythmical feeling in the lines and colour, so that others reading may appreciate the music. Should your subject be a breezy day, tell it in the swing of the branches against the scudding clouds; or a mellow summer afternoon, let it be felt in the sleepy attitude of the horses standing in the shadow of the haystack; should the sun have just gone down in a low bank of clouds 'neath a saffron sky, and the mist be rising on the placid surface of the reed-fringed lake, let the plaintive song of the evening hour steal across the water and out of the picture into the soul of the onlooker; or if you wish to give the stir and bustle of the great city, let your figures, carts, cabs, 'buses, etc., be full of motion. Let every sketch you do have an effect, let it be broad and simple in treatment, the principal group or chief point of concentration well defined; have secondary points of interest, but be sure to keep them subservient to the main one. Do not try to copy the style of any artist whose work you may have taken a fancy to; study him if you like, delight in his creations, but remember that no two men see things exactly alike, and that you, though admiring and learning of others, must look at things with your own eyes and put your own individuality into your work; then, and only then, will that work be successful."

Mr. J. D. Crace, in proposing a vote of thanks to the lecturer, said there were no limits to the delights of painting from nature. There were many very useful hints in the paper, and as to one, *i.e.*, the admonition not to sketch according to the manner of someone else, that practice was very frequent but a very dangerous one, and it was destructive to seeing nature properly. It was a common thing nowadays to see an artist, particularly one who called himself an "impressionist," producing work which was a distinct copy of the work of some French or other artists who had seen nature in a peculiar way. The imitator tried to get the same effect on the same lines. That was wrong, for each man should see nature for himself. Before a room full of architects,

the hints they had had on clouds were not the least valuable of the information given. Every one who had made an attempt to study the nature aspect of buildings must realise the important part played by clouds, and a fine sense of the use of clouds was a valuable asset: showing up a tower against a cloud, for instance, had a good deal to do with the effect obtained. A subject hardly touched upon, but one affording a valuable training in colour, was the sketching of flowers—the grouping of flowers and painting the result; the importance being that in flowers one found a purity of colour which gave training in harmony. Anybody could make more or less of a harmony—or at all events something that was not altogether displeasing in low tones, but it was quite a different thing to bring the clearer tones of colour into harmony, and it required more study and judgment. He had one little point of criticism—Mr. Forbes spoke of mixing raw sienna and cobalt. He warned the lecturer and others that raw sienna having a basis of iron, was destructive to cobalt, though the result was not seen at once. They should be used separately. Used together they were bound to fade or discolour, and the practice was an extremely injurious one.

Mr. C. H. Strange seconded the vote of thanks, and said he thought it was a matter of great satisfaction, and particularly to the Association, that the standard of water-colour painting amongst architects had risen during recent years. He believed it was very much due to the Association that the drawings in the Architectural-room of the Royal Academy Exhibition improved as they did year by year. One saw careful drawings of buildings, which were helped very much by the evident and earnest effort that had been made to give an artistic rendering of surrounding natural objects. Of course, when drawing new buildings, as they were bound to do, they were met by this thought—was it legitimate to represent in a perspective drawing of a new building the natural surroundings which that building would have, say, in fifty years' time? He thought it was not right to do so. An architect was not justified in most cases in representing his building as fifty or one hundred years old; but he should represent to his client as nearly as possible what the building would look like when first erected. While he said that, he thought that modifications might be allowed in the way of making the drawing as artistic and as harmonious in colour as he possibly could.

Mr. W. Bainbridge Reynolds said he learnt from his brother, who learnt it from his instructor at the Royal Military Academy at Woolwich, that "high light" was "sky light." The instructor used to convey his hints in rhyme, in that form, and he illustrated them by actual illustrations in water-colours. Some of the officers instructed in that way became very good amateur water-colour painters. He might call their attention to a book entitled "The Châteaux of Touraine," by M. H. Lonsdale, published by Eveleigh Nash, London, in 1906. It contained some instructive coloured illustrations by Jules Guerin, from which some useful hints could be gained.

Mr. E. Gunn, an old student of the lecturer's, said he found water-colour work to be as delightful as Mr. Forbes represented it to be.

Mr. W. G. B. Lewis said he hoped there would be a good number of students who would take up water-colour work. They would learn a great deal about grouping, which was invaluable from the design point of view; they would learn much as to colour and perception of tone and begin to perceive beauties the existence of which were not dreamt of before. Their view would be broadened, and they would start designing to suit the position and its surroundings, and many little pet ideas, which formerly they were anxious to include, would be left out. He might remind them that Mr. Forbes started his career as an architect. As illustrating an early mistake he would tell them he once prepared a competition perspective. It was strongly drawn in sepia and intended to be sufficiently vigorous to attract attention, which it did, for at the bottom of the drawing when it came back he found the words, "The late fire."

Mr. Cecil Sharp asked Mr. Forbes if he would give them an idea of the least number of colours one should use in water-colour painting, that is, the least number of colours a student should take in his box for sketching. There were so many colours, that it would be a help to a student to know the minimum number of colours he should take in his colour-box. As to the methods proposed for getting the right effect, his master used to make him take a square piece of cardboard with a hole in it, 3 in. by 2 in., and get him to paint what he saw through that hole, and so obliterate surrounding detail and get a good effect of all one wished to see. As to copying, he should have thought that to copy a well-known artist, if one took a fancy to the style or manner in which he drew, and to emulate his work, would not necessarily mean the hopeless copying of that work. They might copy a style, but eventually they would produce another. He did not think there was much harm in copying so far as they could copy a good artist, because one could never really copy him, but it certainly would be a help. It gave him great pleasure to support the vote of thanks to the reader of the paper.

Mr. T. C. Yates said that their former water-colour instructor, Mr. Sutton-Palmer, used to insist on the importance of half-closing the eyes in such work, and the greatest artists did so in order to exclude detail and get correct tone. He (the speaker) was Secretary of the Architectural Association Water-colour Class when Mr. Weedon was appointed Instructor, and he had the pleasure of recommending him to the appointment. As they knew, Mr. Lewis was the Instructor subsequently. He agreed with what Mr. Lewis said as to the value of water-colour drawing as enabling one to appreciate the beauties of nature.

The Chairman, in putting the vote of thanks to the meeting, said he thought that Mr. Crace's hint as to mixing raw sienna and cobalt was a particularly interesting one. The want of such knowledge was often a pitfall to people who were beginning, and though it might be a good thing, really, for some people to use colours that were not permanent, it was sadly disappointing to them. Indigo was a colour freely used by beginners, and it turned a curious colour. Chinese white, again, was a difficult material to use. He used Chinese white in a seascape once, and his white horses on the waves became in time like black horses. The qualities of the whites were variable. As to making antique water-colours, or of making modern buildings look like old ones, he did not think they should try and imitate the hand of time in architectural work. He agreed that one of the most important matters was to know where to limit one's palette, and it was astonishing how few colours were used by some of the great artists. Mr. North, a fine water-colour painter, gave some results on this subject once, and the number of colours he recommended to beginners was very limited. One important matter often lost sight of was the value of white paper on which the water-colour was done. The transparency of the white paper coming through the lighter parts of the work was invaluable, and in sketching it was too often lost by superimposing the opaque colours one on top of the other in endeavouring to get strong effects. In that way one lost the brilliancy of the effect of the white paper beneath. Another important point was that beginners painted far too dry. [Mr. Forbes: That is so.] He was once told that when in trouble with his paint nothing was so good as to put the whole thing into the bath, for it got a freshness that way. Architects were under a disadvantage in making water-colour drawings, for they knew far too much—they knew far more than was possible for the naked eye to see, and they were inclined to put far too much into a work. They should not try and paint every leaf on a tree, for instance. There was an extraordinary disappearance of all detail in bright sunshine, and in the case of a white building like some of the Italian buildings he could remember—a Campanile, for instance—one saw the cornice because they knew it was one, but they really did not see it because the light was so strong. What they saw was the cast shadow, and he found that one of the most successful ways of setting to work was to start by drawing in the cast shadows only; getting the outline of the tower and then the cast shadows; if these were drawn correctly, the effect and contour was got without detail, for no one could look at a white tower in sunshine and see the detail. As to the gradation of colour referred to by Mr. Forbes, a great many beginners found that by the time they got to the middle distance their palette was exhausted, especially if they were painting green fields and trees, and when they wanted strong colour in the foreground of the picture they had nothing strong enough left. Mr. Forbes said—put in your trees full strength at once; but that was one of the most difficult things to do, and it required great knowledge, for often, by the time they had put in something else the effect of the tree appeared quite weak. Keeping to the right tone could come only by great practice. As to the treatment of figures in landscape, Mr. Forbes said that his practice was to draw in the position that the head and the feet would occupy, and to finish it at home at leisure, and he also said that the figure should be full of motion. He (the speaker) believed that a large amount of practice and immense knowledge were required to impart to a figure in a landscape the real motion belonging to it unless it was drawn on the spot, however roughly, and in his opinion it was much better to do such work on the spot.

The vote of thanks was then put to the meeting and very heartily agreed to.

Mr. P. L. Forbes, in reply, said as to putting in figures at leisure, he did not mean when one reached home, but after the figure had passed. That was all they could do. They might put in a woman's shawl, but by the time they had done that the woman had gone, but they remembered the action, and while that remained on the retina they could complete the figure. As to putting in trees full strength at once, he said do that because it could not be done; they had to put in what they considered full strength. That was much more easy on a small 14 in. by 10 in. or 10 in. by 8 in., and that was why he did small sketches and bigger things from them; for then one got the right strength at once. If they did things imperial size, their first full strength required greater strength afterwards. In the old days full strength used to be got by thin layers of wash—seven or eight layers of blue, for instance, and he did not know how they succeeded. Another great thing used to be Indian-ink for shadows, but that was a prehistoric method. As to looking through a hole in a cardboard in order to get the focus, he did not advocate that method because everyone should learn to do without such aids. He had seen young ladies in Westminster Abbey making use of this method and others, but they did not teach themselves confidence that way. They did not become good sketchers by using apparatus. They might use their hands for limiting their view, and ought to know perspective so well that they could see the whole picture before them as though it were on a perpendicular sheet of glass; but a person who did not know perspective could not do that. As to painting the shadows that were cast, it was a fine practice to go in for shadow painting, and to suggest the whole thing by shadow. In his first two pictures which he exhibited

at the Royal Academy he put in the shadows first. He drew the outline and put in the shadows. As to the use of water, pupils often got the thing too wet, and it was difficult at first to know the exact amount to employ. They should always use a full brush and plenty of colour in it. If they got muddy colour on their water-colours, they should wash it out, and get to the texture of the paper; in any case they should get the colour well into the paper. As to flower groups, he ought to have referred to them because they gave one of the finest opportunities for learning colour. Take a bunch of wall-flowers and put them in a dark blue bowl, and then paint them, not as botanical specimens, but as a mass of colour. Keep the colours low tones—not garish, as one saw in some exhibitions. The great fact about sketching was that it opened ones eyes and enabled one to see beauty everywhere. An artist once drew his attention in autumn to the colour of the bark of the plane-trees on the Embankment. It was a beautiful colour, but he had not noticed it before. One of his pupils said to him the other day—before I started sketching I never looked at the sky; now I am always looking at it. As to skies, London ones were very fine because of the murky splendour about them; in the country they were beautiful with a pearly beauty. He had to plead guilty to the mixing of raw sienna and cobalt, but it was constantly done by artists. Sienna was a very useful colour, and so was Indigo, but when injudiciously used the latter blackened. David Cox and others used it, and it had blackened in their work. As to representations of new work, they must not think that he advocated making old masters of new work; there was too much of that done. But they could give material landscapes and cloud shadows in drawings of buildings, and generally give a naturalistic look to their work. They could do this and put rain-marks, etc., under their window-sills, and do a little of that sort of thing to suggest that the building had been up about a year. Plenty of marks of that kind came in a year.

The Chairman announced that the next meeting will be held on March 20, when Mr. H. Tanner, jun., will read a paper on "Domestic Work of the Renaissance in England."

The meeting then terminated.

MAGAZINES AND REVIEWS.

THE *Burlington Magazine* gives illustrations, accompanied by an article by Mr. Cecil Smith, of the fine Greek draped statue of a woman which the British Museum recently acquired at the Trentham sale. As Mr. Smith remarks, it is not often that a Greek statue of the good period comes into public auction in England, and it is a piece of good fortune for the British Museum to have secured it. Mr. Smith assigns to the work a date of shortly before 300 B.C. Professor Strzygowski contributes an article on the interesting subject "Turner's Passage from Nature to Art"—that is, of course, to the artistic manner of treating nature as the basis for a work of art; a subject which naturally suggests some critical considerations on the relation between Nature and Art, so little generally understood in this country. Mr. D. S. MacColl follows with a paper on "Turner's Lectures at the Royal Academy." Curious lectures they must have been; the struggles of a great mind to express great thoughts upon art, without having acquired the command of language necessary for their intelligible expression. The lectures were largely concerned with the subject of Perspective, which Turner seems to have read up very carefully. Mr. MacColl says:—

"It follows that if there were departures from strict perspective in his practice, as of course there are, they arose neither from indifference nor ignorance, and it is clear that he was conscious of the departures and of the reason for them. He makes a distinction between (1) the scientific principles of perspective; (2) the practical methods by which an artist may arrive at correct perspective without taking on the whole load of theory; (3) the modifications in correct perspective called for by the necessity of giving an impression of truth instead of copying a fact. He allows also for the sacrifices of fact made necessary by design. He thought it wholesome that students should understand something of the 'science of vision,' as he calls it in the reading for one of the lectures, but he does not confuse this with the art of vision based on it. The distinction had evidently impressed him from an early date, for he recalls a conversation with his master, Thomas Malton, who told him it was impossible to make the towers of Westminster look as high as they are by drawing them in strict perspective."

Perhaps this theory is not unfrequently put into practice, consciously or unconsciously, by architectural draughtsmen at work on a perspective. Mr. Clement Heaton contributes an article on "Early Stained Glass and Romanesque Architecture at Rheims," in the course of which he alludes to the unhappy effect produced in the cathedral by the blaze of white light in its lower part, causing the ancient glass in the clerestory to look heavy and dull by comparison; only one of many instances of the ill-effect of lighting a great interior more from below than from above. A short note signed "Alethea Wiel," on the scaffolding in use at the rebuilding of St. Mark's campanile, would be of more interest it it were a little clearer in description of the structural facts. We gather that the scaffold, with a roof to it, is carried on four great horizontal beams, one on each side of the structure in progress, and is arranged to be moved bodily upward, by shifts of about 5 ft. at a time, as the walls go up; but it is not made quite clear what is the *point d'appui* for this movement. The scaffold seems to excite a great deal of interest, and is said locally to be more picturesque than the completed tower will be; which is very likely. We have always thought the rebuilding, as an imitation of the original tower, a mistake.

In the *Art Journal* Mr. Clifford continues his articles on Nature Study, with one or two fine drawings of his own from woodland scenery. A new series of sketches of scenery is started, "Netherlorn and its neighbourhood," by Mr. Patrick H. Gillies, with illustrations by Mr. A. Scott Rankin; of which a drawing of "Clachan Bridge," a narrow single-arch stone bridge of Telford's, seventy feet span, is particularly fine. The frontispiece to the number is an etching of St. Martin-in-the-Fields, by Mr. Malcolm Osborne.

The *Architectural Record* (New York) is mainly occupied by a long series of small plates of rather odd-looking buildings, with the heading "In the cause of architecture" running on the top of each page. This is also the title of an essay prefixed to the illustrations, by Mr. F. Lloyd Wright, who we gather (though it is not expressly stated) is the architect of all the buildings illustrated, and whose position is that a true American architecture should get rid of all the conventional details called "architectural," and endeavour to render each building a distinct and original thought; and that the feeling for organic unity in a design is fostered by the study of nature rather than of Vitruvius and Vignola. We have heard all this before, of course; but Mr. Lloyd Wright seems to have tried to carry it into practice with more system and perseverance than one generally finds in connexion with theories of this kind. Some of his buildings, interiors especially, have a great deal of character; and his plain but effectively grouped factory, "the Larkin Building," is a remarkable example of architectural expression attained by mere mechanical building, without anything of what is usually called architectural treatment, though it cannot be said to be very beautiful. This kind of endeavour in architecture, to keep out all the commonplaces and begin anew with fundamental ideals that underly all architecture, is always interesting, and may lead to something, though there is always the danger of eccentricity connected with it—a danger which Mr. Wright has not quite avoided. Architecture, in its greatest forms, is still a traditional art.

The most interesting of the contents of the *Berliner-Architekturwelt* are a series of illustrations of some street dwelling-houses at Charlottenburg, by Herr A. Gessner. Odd as these are in some of their details, there is a good deal of real poetry of architecture about these street-houses. Herr Frchlich's fine conception for a Crematorium we illustrated last week.

Building, an architectural monthly periodical published in Sydney, of which the fifth number reaches us this month, is a small publication containing many short papers of interest: "Early Australian Architecture"; "How to lay out a town," etc. An illustration of the Head Office of the Union Bank, Sydney, of which Mr. G. C. Inskip is the architect, shows it as a really fine and refined building. Among the correspondence is a letter signed "Burwood," in which the writer laments the want of knowledge of art, and of any opportunity of gaining such knowledge, which hampers the Australian public. He writes—

"Many of the Sydney public, thanks to our galleries, begin to know a little about pictures, which few of them will ever be in a position to buy. But of furniture, which they use, want, and must have, they are left lamentably ignorant.

Surely we might reasonably ask a maternal Government to recognise that art, with a capital A, does not begin and end with painting; and have a little money spent on a national collection of furniture, fabrics, glass, china, and domestic metal work, to serve as a basis on which to form the taste of the public who are to employ the growing school of designers and craftsmen undoubtedly about to be fostered by our new tariff.

Let us turn this tariff to some purpose. Keep out the flimsy built rubbish made over sea, and make a corner in good taste and sound construction for our own use."

We have received a copy of the third issue of the new monthly periodical *The Illuminating Engineer*. This is a journal devoted to a study of the methods of illumination by every description of artificial illuminant. The current issue has a special section on "Illumination and the Architect," in which a plea is advanced for greater co-operation between the architect and the illuminating engineer. The journal contains several articles of interest to photometrists. We hope the influence of this periodical will be used to put a stop to the display of batteries of powerful arc-lamps outside shop-windows. The Corporation of London introduced a short time ago a regulation prohibiting the use of unshaded high-power lamps outside shops in City streets, but they appear to lack either the power or the courage to enforce the regulation, for some of the most dreadful examples of vulgar and garish shop-lighting are still allowed to dazzle and annoy City pedestrians.

Concrete and Constructional Engineering gives abundant evidence of the increasing use of reinforced concrete in this country. Among other examples of work described and illustrated are the Manchester Post-office building, the Birmingham Telegraph Stores, various types of reservoirs in an article by Mr. E. R. Matthews, A.M.Inst.C.E., a novel type of leading jetty on the Manchester Ship Canal, the new water-tower at Cleethorpes, two factory chimneys at Briton Ferry and Belfast, factory buildings at Rainham, a building for the Irish Land Commissioners, Dublin, coke hoppers at the Blackburn Gas-works, and a water reservoir in Edinburgh. There are also articles describing a ten-story warehouse building in Pittsburg, U.S.A., some interesting bridges in Italy, and a novel method of applying reinforced concrete to sea defence work in Holland. A distinctly new use for reinforced concrete is illustrated by an account of some barges and pontoons built for the Italian Government. It is claimed that the monolithic character of the construction gives high resistance to the rough usage experienced by vessels of the kind, and, of course, the material is a valuable safeguard against fire.

An article in *Public Works* on "Small Water Supplies," by Mr. H. C. H. Shenton, gives a good *résumé* of the principles governing the general design of a water-works system of moderate size. The author's notes on the construction of storage and

service reservoirs are sound on the whole, but we cannot agree with everything he says concerning reinforced concrete reservoirs. Fig. 17, illustrating what is termed a typical service reservoir in that material, certainly does not represent satisfactory design, and another illustration (Fig. 20) intended to enable the reader to grasp "the whole principle of ferro-concrete," merely shows two rolled-steel joists embedded in concrete and connected by a concrete slab not very adequately reinforced by thin rods in one direction only. Mr. W. W. Melville deals with "Economisers" in a contribution that may be commended to steam users, and Mr. F. W. S. Stanton makes some general observations as the first instalment of a series of articles on "Erosion of the Coast and its Prevention." The writer presents a very fair summary of the present position, and we are quite in accord with his advocacy of the need for a central body with power to advise upon and control the execution of coast defence works.

The *Antiquary* contains a valuable historical article by Mr. J. Tavenor-Perry on "The Abbey of St. Mary of the Sandhills," which once on the Dunes of the Flanders coast. It was rebuilt in the XIIIth century, and of this phase of it there exists, it appears, a bird's-eye by Peter Pourbus, as it existed in his day. It appears to have coincided in plan with Clairvaux, but far surpassed the latter in size. Mr. Tavenor-Perry remarks that it is extraordinary that all traces of a building so extensive and so substantial should have utterly disappeared. Among the "Notes" in the same issue is one commenting strongly on the proposed sale of the ancient chalice of a church near Worcester to an American millionaire who is making a collection of chalices. The pretext is to raise money for the restoration of the church. We entirely agree with our contemporary that such a transaction is, from every point of view, in the worst possible taste.

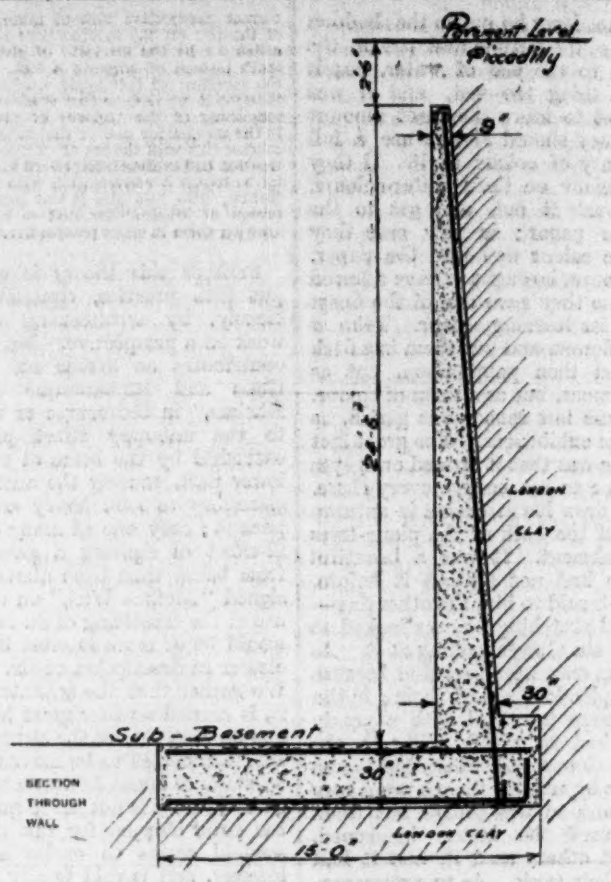
The *National Review* contains a good summary of Lord Kelvin's scientific work, from the able pen of Sir William Ramsay.

Scribner contains a critical article on "The Art of Millet," by Mr. Kenyon Cox, who does justice to the French painter's greatness of character while a little overrating his art. Millet's sincere and unaffected treatment of rustic life and character in painting appeals very strongly to some of our healthiest feelings, with the result that their artistic value has been somewhat exaggerated. Millet's best art work was really shown in his earlier paintings, in a class of subject which he subsequently abandoned, though his beautiful picture "The Goose-girl," which forms one of the illustrations to the article, shows that he could return to it at pleasure in his later days. The article under "The Field of Art" takes us to a rather out-of-the-way subject—"American and Russian Painting in the Toledo Museum of Art."

In the *Century* Mr. H. B. Hersey, under the title "Experiences in the Sky," gives some information as to recent work in ballooning. The number also contains an article on and illustrations of "The Later Works of Augustus Saint-Gaudens," the late American sculptor, and perhaps the greatest artist America has yet produced.

INSTITUTION OF GAS ENGINEERS.—The annual general meeting of the Institution of Gas Engineers is to be held in London from June 16 to 19, under the Presidency of Mr. W. Doig Gibb, M.Inst.C.E., Engineer to the Newcastle-on-Tyne and Gateshead Gas Company.

ST. ALBANS CATHEDRAL.—The organ, formerly placed above St. Cuthbert's screen, has, through the generosity of the late Lord Aldenham, been recently divided so as to open up the view from west to east, and has also been thoroughly remodelled and considerably enlarged, the cost exceeding 3,000*l*. The organ has been built into the main and triforium arches at a level above the screen, and is enclosed in carved oak cases, designed by Mr. John Oldrid Scott, in a style in keeping with the episcopal throne and stalls erected in the choir as a memorial to the late Bishop Festing.



A Ferro-Concrete Retaining Wall in Piccadilly.

A FERRO-CONCRETE RETAINING WALL, PICCADILLY.

ONE of the most useful directions in which reinforced concrete can be applied in architectural practice is to the construction of retaining walls for the basements of buildings, especially as structures of this class can be designed so as to escape the worrying and irrational restrictions of the London Building Act and similar regulations.

Important examples of retaining wall construction are to be found in the North-Eastern Railway Goods Station, Newcastle-on-Tyne, and in the General Post Office Extension, the retaining walls in the latter case being 26 ft. high and extending around an area of more than two acres. Another recent example is in the basement of the Royal Insurance Company's new premises at the corner of St. James's-street and Piccadilly, this wall being 24 ft. 6 in. high, as shown in the accompanying illustration. The wall is only 30 in. thick at the bottom, and tapers to 9 in. thick at the top. If constructed of plain concrete in accordance with the customary rule, which prescribes one-third of the height for the thickness, the wall would have been fully 8 ft. thick at the bottom, thus involving much avoidable expenditure on materials and occupying a large amount of space, which has been added to the basement floor area by the adoption of reinforced concrete.

The reinforcement in the vertical portion of the wall consists of 1¼ in. Indented steel bars spaced 4½ in. apart for the height of 14 ft., and spaced 13½ in. apart for the remainder of the height. This means that every third bar was carried from the bottom to the top of the wall, the intervening bars being stopped at the height of 14 ft. from the bottom. The object of these bars, of course, is to reinforce the concrete against tension. To afford secure anchorage each bar is bent at the lower end and hooked over a corresponding bar in the horizontal portion or base of the wall, where a double system of reinforcement is provided, as shown on the drawing. In addition to the bars there shown, binding bars were introduced along the front edge to aid the concrete in compression.

All the concrete was machine mixed, in the proportions of 1 part Portland cement, 2 parts sand, and 5 parts Thames ballast, from ¾ in. down to ¼ in. gauge. The method of construction adopted was first to excavate and timber a trench 15 ft. wide, the sides being lined with boards, while struts 8 in. square were disposed from side to side at intervals of 7 ft. apart horizontally, and 3 ft. apart vertically. The wall was then moulded in place, holes being left slightly larger than the struts, so that the latter could be drawn without difficulty. After the concrete had been left to harden for rather more than three weeks the earth pressure was transferred to the retaining wall by means of short struts. Then the remainder of the excavation for the basement was executed, the struts were drawn from the retaining wall, and the holes in the latter were filled up. The outer surface was sheeted with asphalt, and after removal of the short struts the intervening space was filled in with hard brick rubble.

The reinforced concrete work was executed by the Empire Stone Company, in accordance with the Indented Steel Bar system, the architect of the building being Mr. John Belcher, A.R.A.

TEST OF REINFORCED CONCRETE FLOORS.

FROM February 7 to 15 one of the floors in the Postal Telegraph Store Building, which has recently been completed in reinforced concrete by H.M. Office of Works, from the designs of Mr. J. Rutherford, was officially tested in the presence of the architect's representative, the contractors, and other interested parties.

The building is 205 ft. long by 60 ft. 6 in. wide by 60 ft. high, and comprises four floors. It exemplifies the skeleton method of construction, all loads being carried by a framework consisting of reinforced concrete column beams, lintels, and floor slabs; while the panels in the walls are filled in with brick and stone work.

The ground floor was designed for the superload of 560 lb. per square foot, the first and second floors were designed for the superload of 325 lb. per square foot, and the third floor was calculated for the load of 225 lb. per square foot.

All the reinforced concrete work was

executed from designs prepared by the Trussed Concrete Steel Company, the steel being applied in the form of Kahn bars to the columns, beams, and floors.

On Wednesday, February 5, a portion of the ground floor with the area of 323 sq. ft., extending over three beams, was loaded up to 2½ cwt. per square foot, remaining under that load until 8.30 a.m. on Friday, February 7, when deflection indicators were adjusted in position beneath one of the beams with the clear span of 23 ft. At 9 a.m. no deflection was recorded, and the load was increased up to 5 cwt. per square foot. At 11.40 a.m. the maximum deflection was ¼ in., and at 2.30 p.m. the instruments recorded the maximum deflection of $\frac{5}{32}$ in.

The loading was then increased to 7½ cwt. per square foot, or 50 per cent. above the calculated superload, with the result that ¼-in. maximum deflection was indicated.

After the same load had remained in position until 4.40 p.m., the instruments registered no increase of deflection.

As the specified limit of deflection was ½ in., the amount recorded was only half that allowed by specification.

Instructions were next given for removal of the additional load of 2½ cwt. per square foot, and when this had been done the maximum deflection at 7.30 p.m. was $\frac{7}{32}$ in. The load of 5 cwt. per square foot was kept on the floor until 7.30 a.m. on the following morning without increase of deflection, and when the whole of the loading had been removed no deflection was registered at 1 p.m., thus showing the perfect elasticity of the construction.

In the conduct of this test the loading consisted of bricks built up in the form of a solid stack, and as the architect was of opinion that arching action might have taken place, he decided to conduct a second test with the bricks piled in independent stacks.

The second test was commenced on February 13 upon the area previously tested by loading the floor up to 2½ cwt. per square foot. After six hours had elapsed deflection indicators were applied, and registered no deflection. Half-an-hour later the load was increased to 3¾ cwt. per square foot, when the maximum deflection was $\frac{1}{16}$ in., and fifteen hours afterwards $\frac{3}{32}$ in., with the same load. Eight hours later the load was increased to 7½ cwt. per square foot, and the deflection became $\frac{5}{16}$ in., or only $\frac{1}{16}$ in. more than the result indicated during the first test. This is interesting as giving a clue to the arching action in a solid stack of bricks.

On Saturday, February 15, the load was reduced to 5 cwt. per square foot, when the deflection was very small, and at 3 p.m. on the 16th the floors regained their normal form after removal of the loading.

The results of the tests point clearly to the adequacy of the reinforced concrete designs, and also to the satisfactory character of the work done by the contractors, the Cubitt Concrete Construction Company.

ARCHITECTS' TECHNICAL BUREAU.

THIS undertaking is now, we understand, in a position to commence operations.

At present over one thousand architects have sent in their names as subscribers. The object of the Bureau is to create for the architectural profession a "Central Office," where could be gathered together manufacturers' trade catalogues, price-lists, pamphlets, etc., and information generally relating to the products of the building trade. These will be carefully indexed upon some approved system, so that inquiries as to the name and address of manufacturers of building specialities or named articles, or where goods at a certain cost or detailed description are to be obtained, can be speedily answered, and at a great saving of time to the busy architect, who cannot afford the time to study circulars or interview the numerous manufacturers' travellers who call. Wherever practicable it is hoped to make this information more valuable by having tests and reports made by independent experts, copies of which will be available to the subscribers of the Bureau.

Records are also to be kept of the firms who supply the materials and fittings to the public and prominent buildings throughout the country. By this means an architect can ascertain where the materials, etc., have been used, for what purposes, the class of building, and who the architect was, for many would doubtless repose confidence in the judgment of some architect well-known to them. By this means progress will be greatly assisted to the mutual benefit of all concerned.

The Bureau will shortly be taking larger and permanent offices, where suitable accommodation will be available, especially as regards a large hall for the catalogue library, and due notice will be sent to all subscribers of the opening.

The Advisory Committee, for the time being, consists of Messrs. Geo. Bertram Bulmer, F.R.I.B.A. (Leeds), Alfred W. S. Cross, M.A., F.R.I.B.A. (London), Joseph Crouch (Birmingham), H. L. Goddard, M.A., F.R.I.B.A. (Leicester), George Hubbard, F.S.A., F.R.I.B.A. (London), Paul Ogden, F.R.I.B.A. (Manchester), William A. Pite, F.R.I.B.A. (London), H. D. Searles-Wood, F.R.I.B.A. (London), Edwin Seward, F.R.I.B.A. (Cardiff), Keith D. Young, F.R.I.B.A. (London).

It is proposed that the Advisory Committee shall be subject to election from time to time by the general body of architect subscribers.

All communications should be addressed to Mr. F. R. Gould Wills, A.R.I.B.A., Secretary, 11, Bloomsbury-mansions, Hart-street, W.C.

Legal Column.

THE INTERPRETATION OF THE LETTERS P. C.

A CASE which turns chiefly upon the interpretation of the letters P. C. has recently been tried for the third time in Dublin. The facts are as follows:—When it was proposed some twelve years ago to build a new lunatic asylum at Ballinasloe, an estimate for a certain amount of concrete flooring was obtained from Messrs. Homan & Rodgers, and its amount included in the bill of quantities issued to builders. On Mr. Samuel Hill, of Cork, becoming the general contractor, he at once entered into correspondence with Messrs. Homan & Rodgers, explicitly stating that he would not be responsible for any payments beyond the lump sum provided in the quantities, but that he was quite willing to transmit to them from time to time their due proportions of the provided sum, according as payments were made to him, on the architect's certificate.

At the conclusion of the work the Galway and Roscommon County Councils, into whose hands the ownership of the asylum had passed, ignored the architect's final certificate and refused to pay the contractor, who, after the complete failure of all negotiations, had to enforce payment by means of a legal action.

In the meantime Messrs. Homan & Rodgers were pressing Mr. Hill for payment of a sum of 376*l.* 7s. 9d., due as a balance on the original P. C. and for certain extra work, and finally instituted an action which was tried before Mr. Justice Wright in Dublin in December, 1906. The defendant paid 89*l.* into court, contending that, although a further sum of 166*l.* was due, it could not legally be demanded until he himself had been paid by the County Councils. The balance he repudiated on the grounds that it was for extra work which he had never ordered, nor had any knowledge of. The learned judge, however, refused to agree to the defendant's contention, and gave judgment for plaintiffs, with a stay of execution. The defendant appealed, and in May, 1907, the case came before Lord Chief Justice O'Brien, Mr. Justice Gibson, and Mr. Justice Kenny, who reduced the judgment for the plaintiffs to 166*l.* Mr. Justice Gibson, in giving his judgment, held that the work represented by the sum of 110*l.* 7s. 3d. claimed as an extra, although it had honestly and properly been done, and probably on the direction of the architects, as it had never been specifically ordered in writing, according to the conditions of the main contract, of which it undoubtedly was a part, it would have been impossible for the defendant to enforce payment for it from the County Council. There was no formal contract between plaintiff and defendant, but there was a contract nevertheless, the nature of which could be conjectured from the correspondence between the parties, and it was clear that there was no contract to pay for extras. The plaintiffs had claimed that they had an open contract with defendant to do everything necessary to complete what was contemplated in the main contract, whether the work was contract extra or not, whether it had been ordered by the defendant or not, and that they were not bound by the terms of the main contract, but there was no evidence that the defendants knew anything about the extras. In the case of other extras there was much correspondence between the parties, a bargain had been struck, and there was no dispute. The plaintiffs had exhibited much imprudence in executing this work without any written or explicit arrangement, especially as the defendant's letters had warned them as to his attitude. The learned judge, therefore, held that if P. C. was read into the contract between plaintiffs and defendant, it should have the same meaning that it bore in the principal contract, where all extras, including P. C. extras, had to be ordered by the architect in the prescribed way. With regard to the sum of 166*l.*, he held that defendant's contention, that no right of action lay until the money had been paid to him by the County Councils, was unsustainable, for, if by his own default he was unable to obtain payment, it could not have been intended that the plaintiffs should lose the price of their work.

Mr. Justice Kenny, in concurring with the judgment in favour of defendant and referring to Mr. Justice Wright's remarks on the first trial that "the defendant assented to the proposition that P. C. meant a provisional estimate which might be exceeded as well as not reached," said "that though the estimate might be exceeded, this admission does not go the length of establishing the defendant's liability to pay for extra or additional work, unless ordered or certified by the architect in such a manner as would enable him to obtain payment from the employer. It is contended for the plaintiffs that the contract was an open one, that the defendant was bound to employ them, and that if extra work was ordered by the architect defendant was bound to have it done and pay them for it when complete, irrespective altogether of his contract with the County Council. In my opinion that contention has been pushed too far. While unquestionably the defendant was bound between him and the employer to have the concrete flooring carried out by Messrs. Homan & Rodgers, there was no contract to pay for work that might be agreed on between the plaintiffs and the County Council, or their representative, without the intervention of the defendant. In my opinion it would be harsh and unreasonable to imply a contractor to pay for work in respect to which the defendant himself might not be in a position to obtain payment."

The effect of this judgment was to order payment to Messrs. Homan & Rodgers of the balance due on the P. C. included in the original quantities, and a small sum for extra work ordered by Mr. Hill, included in his extra account, and paid for by the County Councils, but the larger sum claimed for extra work due to changes in the original plans was not allowed.

Against this decision Messrs. Homan &

Rodgers appealed, and for the third time the case recently came before the Dublin Courts, when the Court of Appeal upheld the decision arrived at on the second trial.

"HOUSE" OR "TRADE" REFUSE.

THE case of Mayor, etc., of Westminster *v.* Gordon Hotels Limited, which will be found discussed in our Notes, April 14, 1906, May 11, 1907, has been carried to the House of Lords on one point. The Hotels Company had summoned the Corporation under sect. 30 of the Public Health (London) Act, 1891, for failing to remove the "house refuse" from the hotel. The Corporation had issued a counter summons under sect. 33 of the Act, alleging the matter to be "trade refuse," for the removal of which the Corporation could require payment. The magistrate had decided in favour of the Hotels Company and the Divisional Court had affirmed the decision, but had given leave to appeal to the Court of Appeal on the Corporation's summons. The Court of Appeal held that under the express terms of sect. 33 the decision of the petty sessional Court was to be final, and therefore that the Court had no jurisdiction to entertain the appeal, and the House of Lords have affirmed this judgment. The statute seems too plain to allow any doubt upon this point, but it is unfortunate that a decision of a superior Court cannot be obtained upon the question of what is "trade refuse," as there is some conflict of authority upon the point, and even the Divisional Court found the matter so difficult to decide that leave to appeal was given. Finality in the law is much to be commended, but when Acts of Parliament lay down definitions, unless some superior Court can be consulted, the inferior tribunals are left without assistance, and there is a diversity of opinion throughout the country.

Architectural Societies.

EDINBURGH ARCHITECTURAL ASSOCIATION.—The members of the Edinburgh Architectural Association, together with a representative of the Associate Section of the Glasgow Institute of Architects, on Saturday visited the Scottish National Exhibition-buildings at Saughton. Mr. Thomas Ramsay, of Messrs. Walker & Ramsay, architects, acted as leader, and explained the chief features of the various buildings. The Industrial Hall was first inspected; the party then proceeding to the Machinery Hall, and thereafter to the Concert Hall, where Mr. Ramsay explained the cantilever construction of the wide horse-shoe gallery, and the manner in which the cantilever pillars were utilised to support the dome. The party then proceeded to the Fine Art Building, in course of being covered with sheets of asbestos and fibre plaster; and to Van Houten's pavilion, an ornamental structure in circular form, similar to that of the last Glasgow Exhibition, which was afterwards retained to form a permanent refreshment and music kiosk in the park. In this pavilion the process of casting the ornamental plaster work for the buildings was seen. The Canadian Government pavilion and other units in the suite were also inspected. The working plans of the various buildings were displayed for the guidance of the visitors. Some interesting details were given as to the cost. The Industrial Hall, which is the main building of the exhibition, costs ¾d. per cubic foot of space, or 1s. 10½d. per square foot of floor space, the total for the hall being 10,340*l.* The Machinery Hall costs 3,246*l.*, equal to 1d. per cubic foot, and 2s. 0¾d. per square foot. The Concert Hall, seated for 2,000 persons, costs 4,997*l.*, representing 2½d. per cubic foot, and 6s. 1d. per square foot. The Art Galleries costs 5,075*l.*, equal to 2½d. per cubic foot, and 3s. 6d. per square foot. The Canadian Government pavilion costs 700*l.*—2½d. per cubic foot, or 3s. 11d. per square foot; and Van Houten's pavilion, 359*l.*—4½d. per cubic foot, or 6s. 2½d. per square foot. It is a gratifying feature that while the Executive have added to the size of some of the main buildings, the actual cost of the buildings originally allowed for is 522*l.* below the estimated cost. At the conclusion of the visit to the exhibition buildings the members of the Edinburgh Architectural Association and the Associate Section, Glasgow Institute of Architects, dined together at Ferguson & Forrester's. Mr. W. T. Oldrieve, F.S.I., F.R.I.B.A., Vice-President, Edinburgh Architectural Association, presided. Mr. Alexander Wingate, architect (Glasgow), in proposing the toast of "The Scottish National Exhibition, 1908," congratulated the Executive Committee on their choice of the site of the exhibition. Councillors Dobie and Currie responded. Mr. W. T. Oldrieve proposed the toast of the "Associate Section, Glasgow Institute of Architects," and welcomed the Glasgow members on their visit to Edinburgh. He also took the opportunity of congratulating Messrs. Walker & Ramsay, who were both present, on their successful designs for the exhibition buildings. Mr. Thomas Ramsay replied, and expressed the pleasure which the Society had derived from the joint visit. Mr. J. G. Gillespie, Chairman of the Associate Section, Edinburgh Architectural Association, proposed the health of "The Chairman," to which Mr. Oldrieve replied.

Illustrations.

COMPETITION DESIGN FOR THE LONDON COUNTY HALL.

WE give this week the elevation and two plans of the design for the London County Hall by Mr. T. G. Jackson, R.A. As we observed, the design differs essentially in character from most of those submitted, being in a much more "free" classic; in fact, though the details are more or less classic, there is a great deal of Gothic element in the design considered as a whole; in the multiplicity of parts and in the absence of any strong and dominating horizontal cornice. It would have appeared a fine and refined building if erected, and the author has contrived to have a lofty central feature without the abnormal size and expense involved in the central features shown in some other designs.

The plans were scored with lines in different colours to distinguish different departments, and these have unavoidably partly reproduced in the monochrome reproduction, and could not be got rid of.

The author's intentions in the design may be best explained by the following extracts from his Report sent in with the drawings:—

"The general scheme of my plan is based on the suggestions given by the assessors, which, I presume, show as nearly as possible the arrangement most convenient for the purposes of the Council. Such deviations as I have made from the assessors' sketch plans have been devised with the object of utilising the area of the site to greater advantage.

The plan explains fully the disposition of the several departments, and it is unnecessary to enlarge on it here. My object has been to keep each department in the same relative position to the rest as the official sketch plan suggested; to get it, as far as possible, on one floor, and where it had to be divided among several floors to keep the spaces allotted to it over one another, with ready intercommunication.

The Comptroller is accommodated entirely on the lower floors.

The Clerk has a great part of the river front on the second and upper floors. His typewriting and printing department is on the lower ground floor, much like the similar department at Somerset House, and is well lit.

The arrangements of the other departments will explain themselves.

The staircases, lifts, lavatories, water-closets, and urinals are distributed regularly throughout the building, and there is a considerable amount of spare space available to be used as necessity may require.

I have taken advantage of roof-space to provide a considerable area for storage, instead of putting it all in the basement. It seemed to me that, in that position, it would be more convenient for several departments, as well as more economical.

The space for members can be entirely cut off from that accessible to the public, and the several committee-rooms may all be reached without traversing any part of the space reserved for members in the middle of the building.

The access to the public gallery of the Council-chamber is by two staircases leading to galleries in the hall of the great staircase, which open into the public lobby, whence the gallery is entered.

The general public entrances are in Westminster Bridge-road and in Belvedere-road.

The former leads by a wide flight of stairs direct to the principal floor, and a large staircase communicating with all floors; from this point, three great corridors traverse the whole building in unbroken lines from end to end, passing on the way numerous stairs and lifts.

There is also a secondary entrance in Westminster Bridge-road, leading direct to the Comptroller's department.

The other grand entrance is in Belvedere-road, by a portico adorned with sculpture, leading to a hall whence a short descent admits to the lower ground floor, which is almost on the street level; while the grand staircase ascends through a lofty domed hall to the Council-chamber and the principal corridor, 15 ft. wide, which traverses the whole length of the building.

There is a private entrance for members only from the terrace on the river front.

There are separate entrances to the assembly-hall, with its retiring-rooms, cloakrooms, and other accessories. . . .

The building would be heated and ventilated by a combined apparatus of hot air and hot water. There would be a "Plenum" installation for the large hall, Council-chamber, and large committee-rooms, and hot-water or low-pressure steam radiators for the corridors and smaller rooms. The principal rooms only have open fires as well.

The steam-generating apparatus would consist of four boilers, 30 ft. long and 8 ft. diameter. The air would be heated in two battery chambers placed about one-fourth of the distance from each end of the building. The air supply would be drawn through large passages in the basement from the river front, and would be passed through screens or filters to remove dust and other impurities.

After passing over the steam-heated batteries, the air would be forced by electric propellers in the vertical shafts marked "hot air" into subceilings formed over the corridors, and thence into the rooms. The used air from all the rooms, and from the Council-chamber, would be drawn off by electric fans through vertical flues in the walls into the spaces in the subceilings, and thence taken to the shafts marked "foul air," and discharged upwards.

The subceiling spaces would be for supply of hot air and extraction of used air, alternately, floor by floor.

All hot-water and steam radiators, and the "Plenum" air supply would be under easy control and regulation, so as to obtain a uniform temperature throughout the building.

I have consulted a well-known firm of engineers, whom I generally employ, and who have heated and ventilated many of the largest public buildings in London and elsewhere, and feel complete confidence in the scheme they have suggested. They estimate the cost at from 7,000*l.* to 10,000*l.*

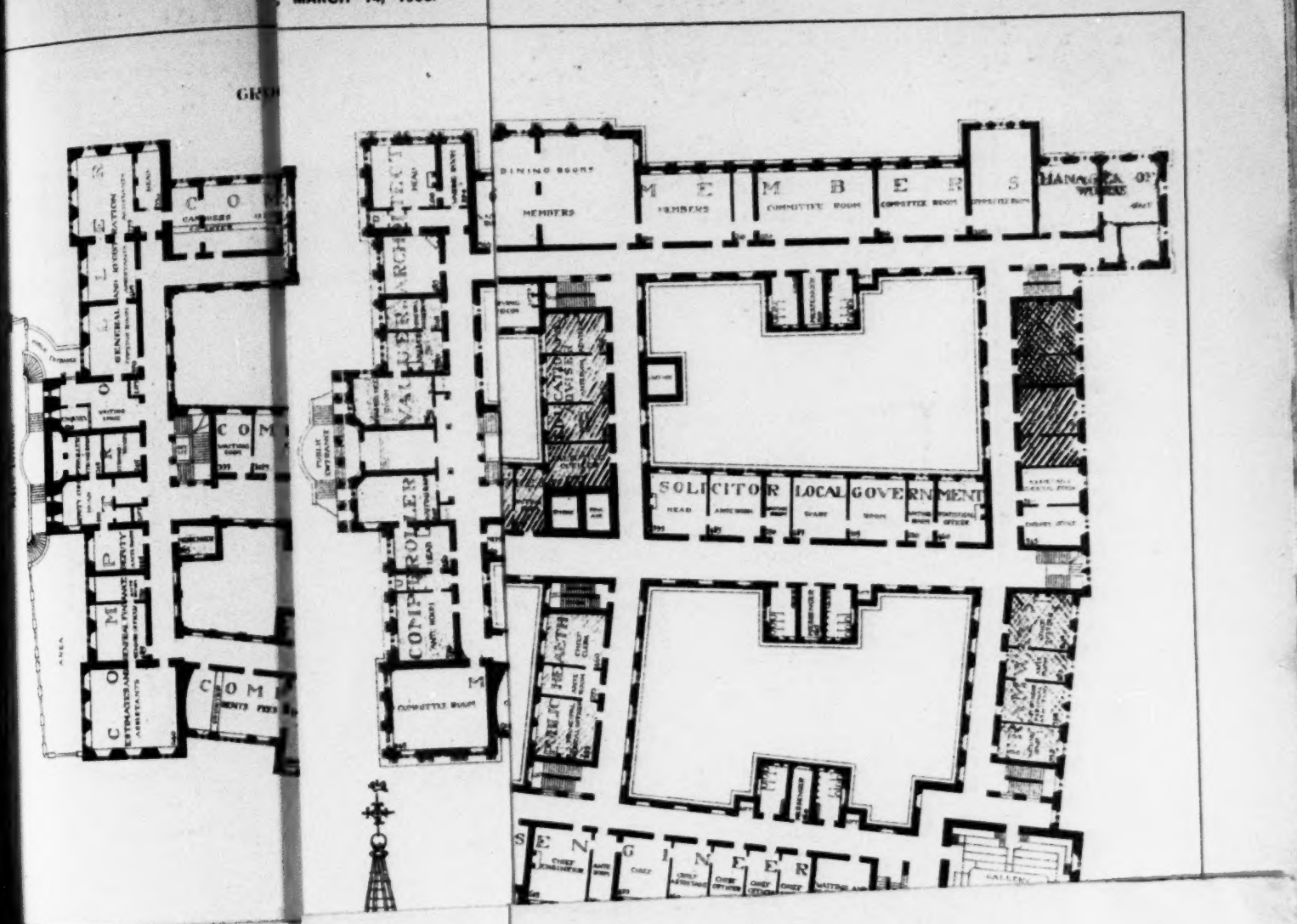
With regard to the architectural treatment, I have proposed a stone front to the river, and stone mixed with brick for the front in Belvedere-road.

The interior of the courts, which would seldom be seen, would be of brickwork in most cases, with wooden window frames, and would be plainly treated.

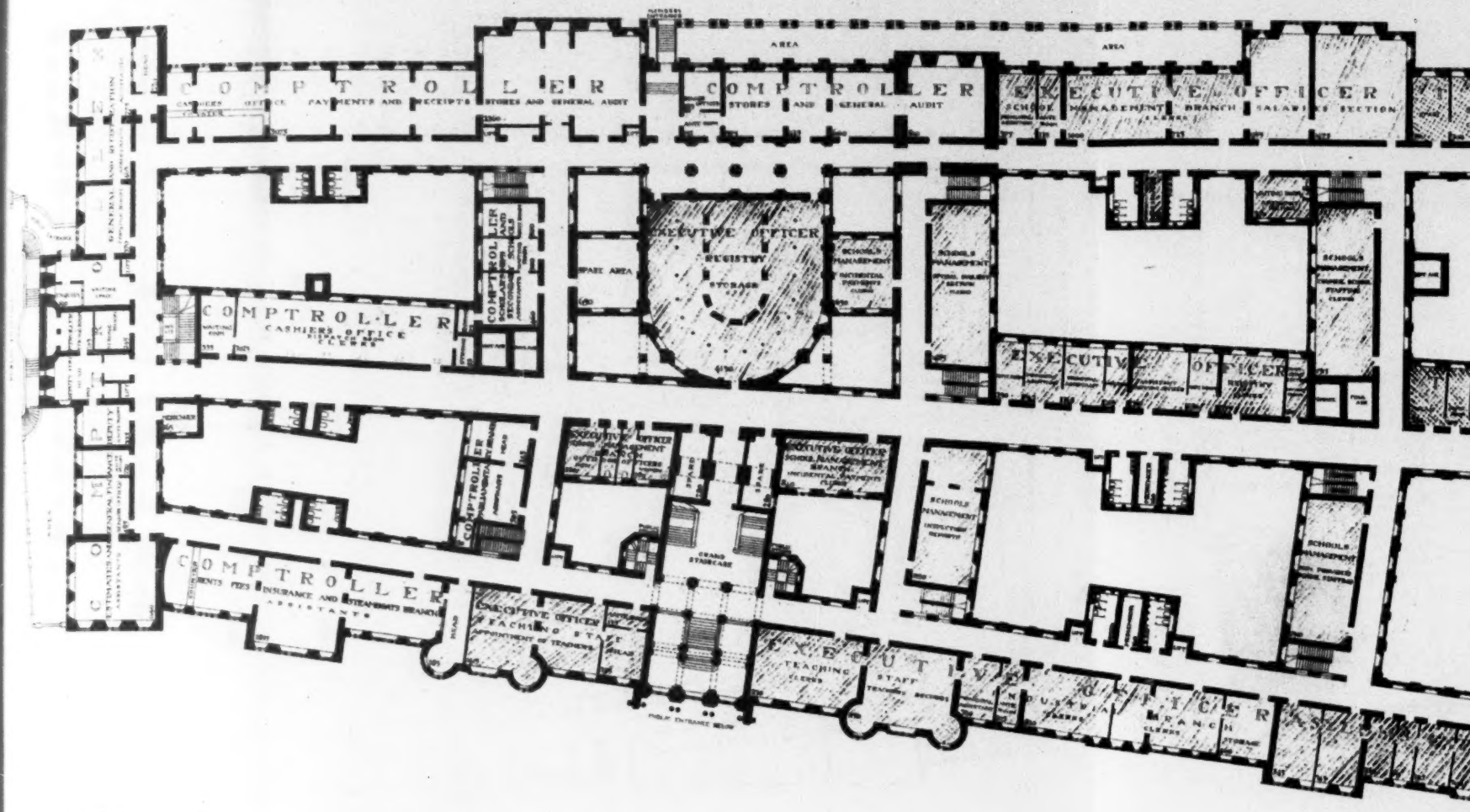
I have found it difficult to give so much breadth as I should have liked to a design which requires such a multitude of small windows, there being, I think, 400 in one elevation alone. By setting some parts of the building back, and projecting others, and breaking the sky-line by towers at intervals, I have endeavoured to give the whole an effect of mass, and variety of light and shade; and I trust the general effect would not be unworthy of so important a building, and so fine a situation."

MYERS MEMORIAL, CHELTENHAM COLLEGE CHAPEL.

THIS is, in an artistic sense, a very unusual memorial, in honour of a very unusual man, the late Frederick W. H. Myers—scholar, poet, and mystic, who has left an abiding memory with all who knew him. We call


DINING ROOM
MEMBERS
M E M B E R S
SOLICITOR
LOCAL GOVERNMENT
ENGINEER

GROUND FLOOR



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COMPTROLLER	12450
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EXECUTIVE OFFICER	[illegible]
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TOTAL	97700

SCALE OF FEET

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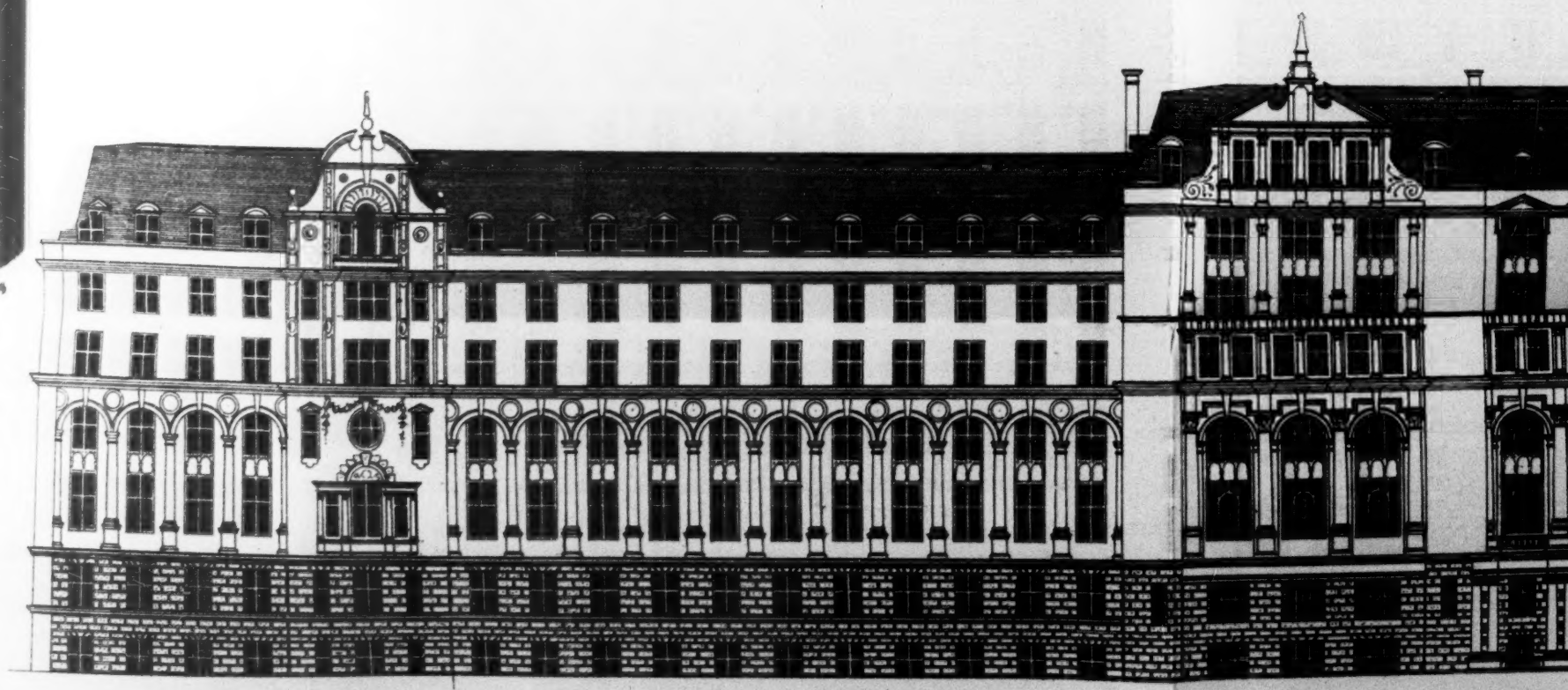
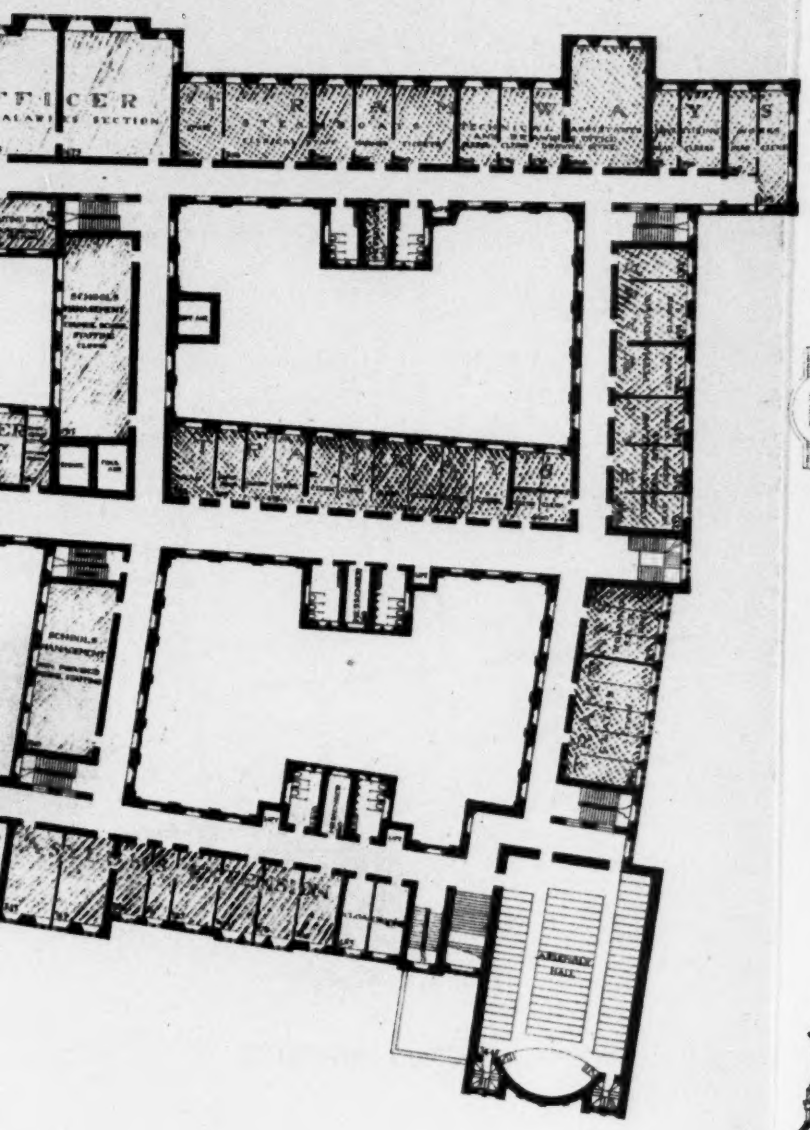
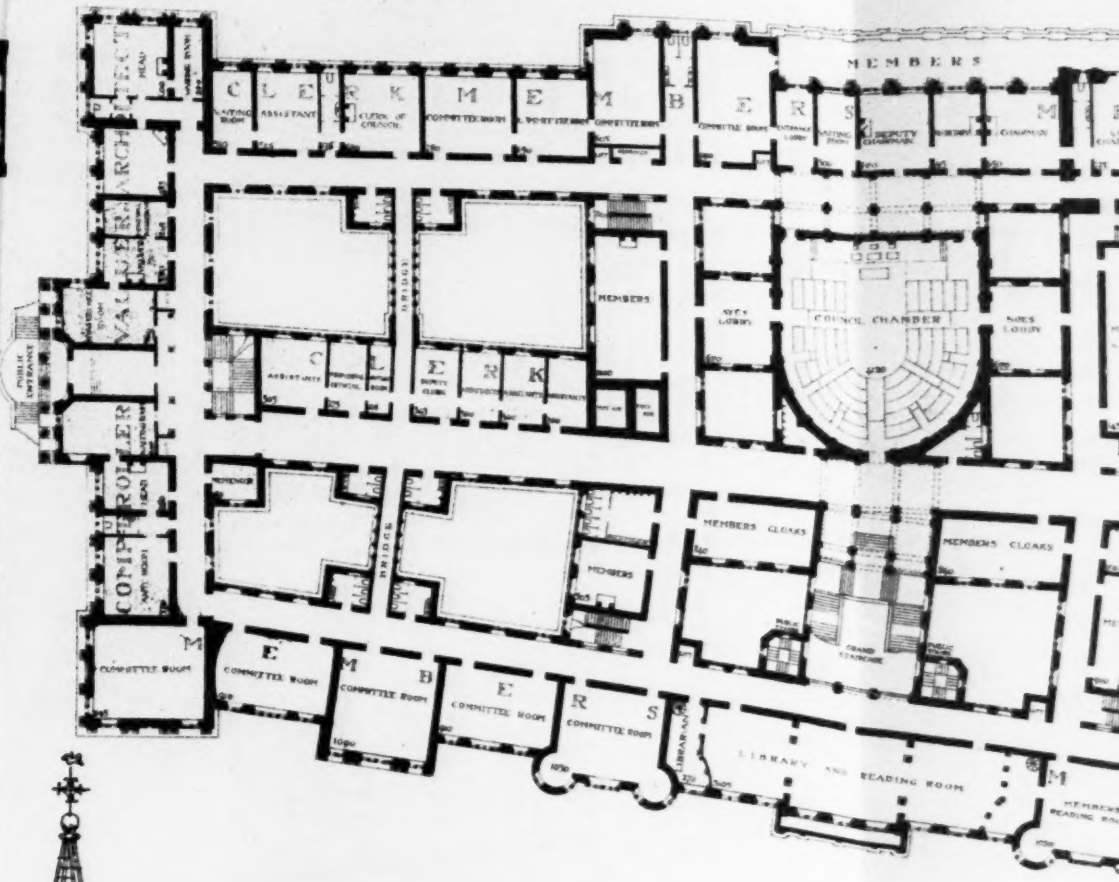


FIRST FLOOR





MEMBERS AREA 40355

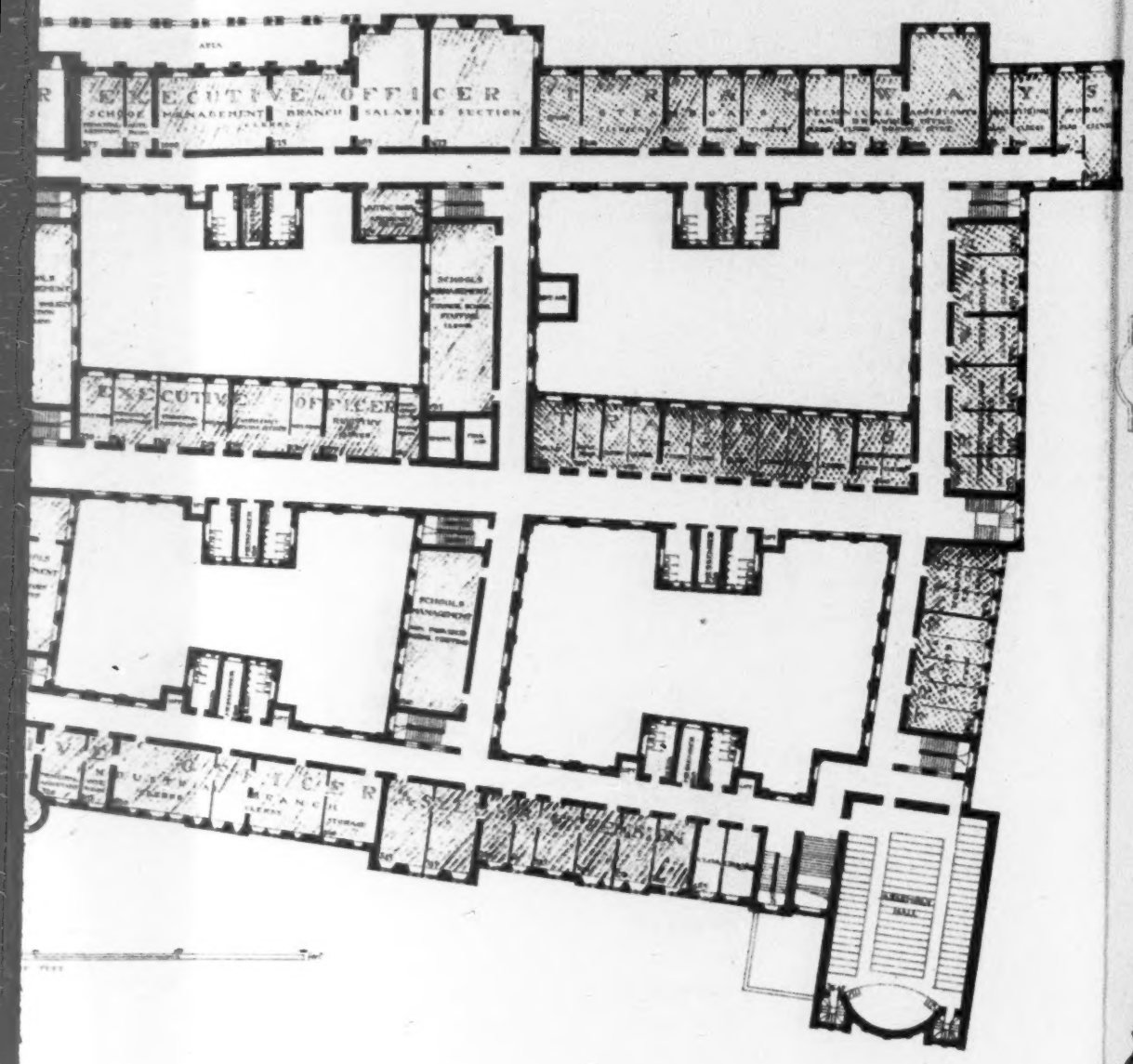
COUNCIL CHAMBER	985
LOBBY FOR AYES	450
LOBBY FOR NOES	600
12 COMMITTEE ROOMS	8520
CHAIRMAN OF COUNCIL	650
SECRETARY	445
WAITING ROOM	300
VICE-CHAIRMAN	735
DEPUTY CHAIRMAN	500
AREA FOR USE OF MEMBERS	7400
LIBRARIAN, LIBRARY AND READING ROOM	3375
CLERK	3875
COMPTROLLER	1650
	43840

	43840
ENGINEER	3250
ARCHITECT	1975
SOLICITOR	1450
PUBLIC HEALTH	1240
VALUER	655
LOCAL GOVERNMENT	2365
FIRE BRIGADE	940
TREASURER	1490
EDUCATIONAL AUTHORITIES	1100
EXECUTIVE OFFICER	650
CHIEF INSPECTOR	650
MANAGER OF WORKS	650
SERVICE	500
TOTAL	64045

150 200 FEET

SCALE

FIRST FLOOR



COUNCIL CHAMBER	4[illegible]
LOBBY FOR 'AYES'	670
LOBBY FOR 'NOES'	670
12 COMMITTEE ROOMS	8520
CHAIRMAN OF COUNCIL	650
SECRETARY	445
WAITING ROOM	300
VICE-CHAIRMAN	335
DEPUTY CHAIRMAN	300
AREA FOR USE OF MEMBERS	7300
LIBRARIAN, LIBRARY AND READING ROOM	3375
CLERK	3375
COMPTROLLER	1650
	45840

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ENGINEER	3250
ARCHITECT	1035
SOLICITOR	1440
PUBLIC HEALTH	1240
VALUER	855
LOCAL GOVERNMENT	1365
FIRE BRIGADE	660
TRAMWAYS	1650
EDUCATIONAL ARCHITECT	1100
EXECUTIVE OFFICER	1840
CHIEF INSPECTOR	630
MANAGER OF WORKS	1350
SERVICE	300
TOTAL	64043

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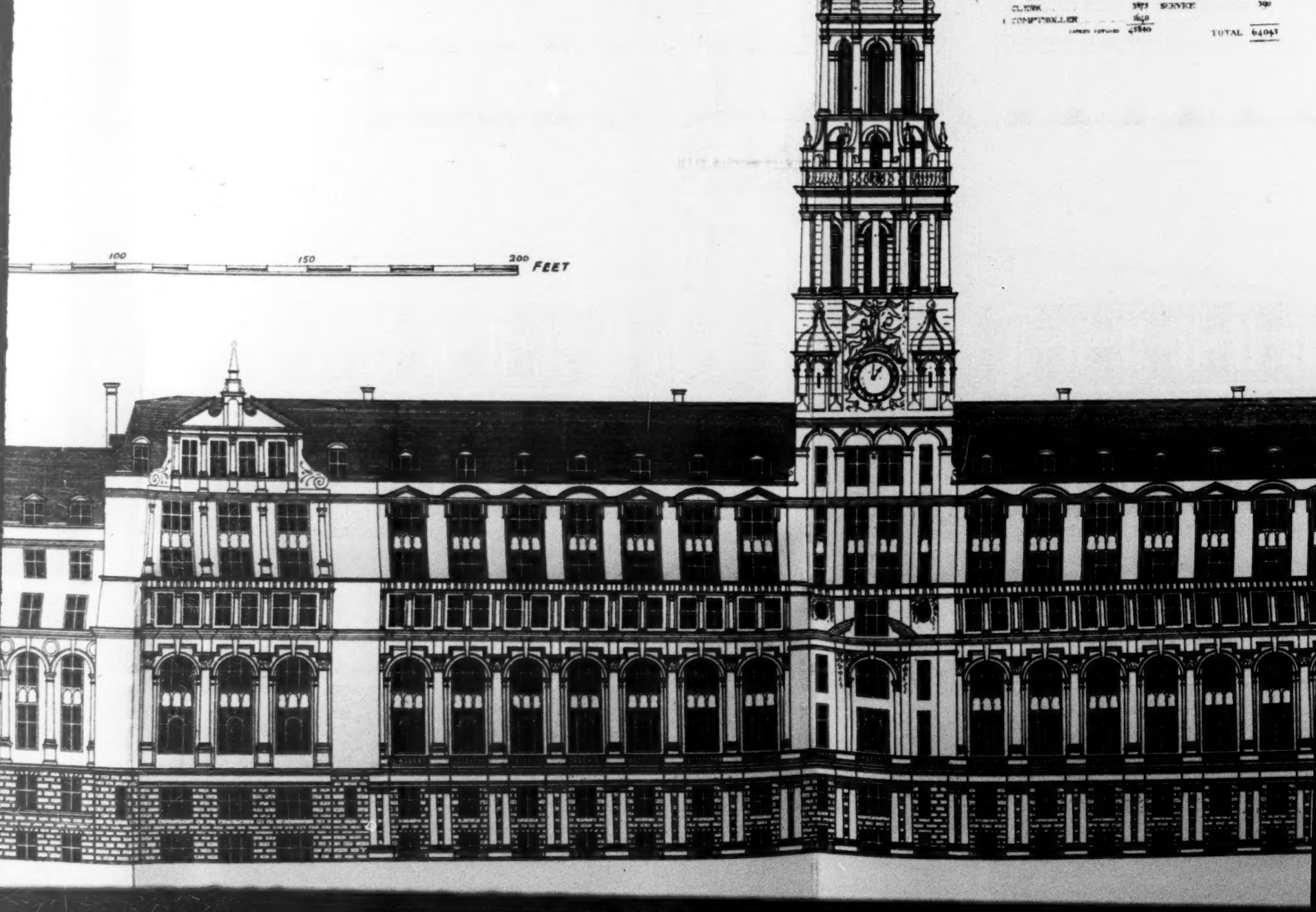

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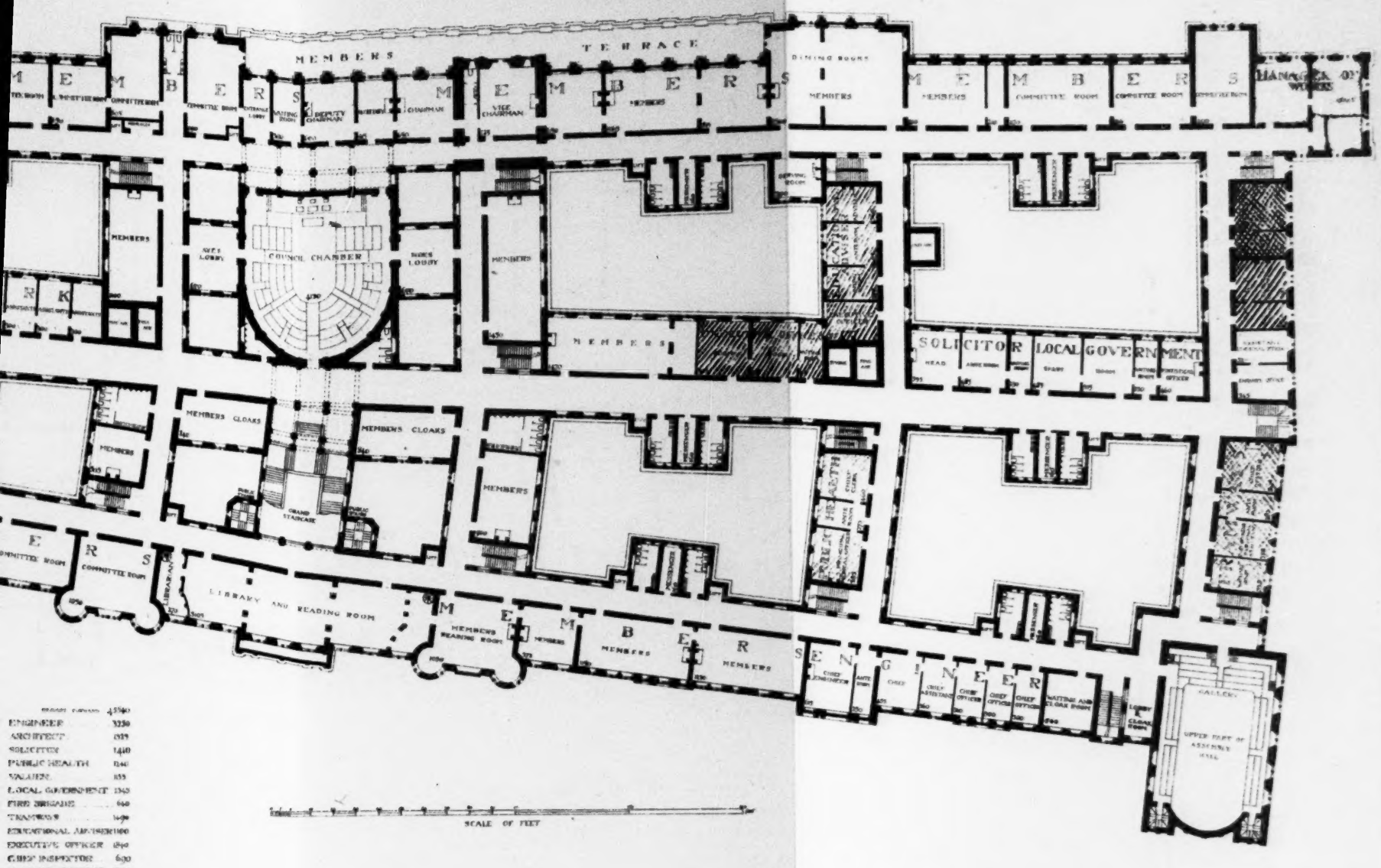
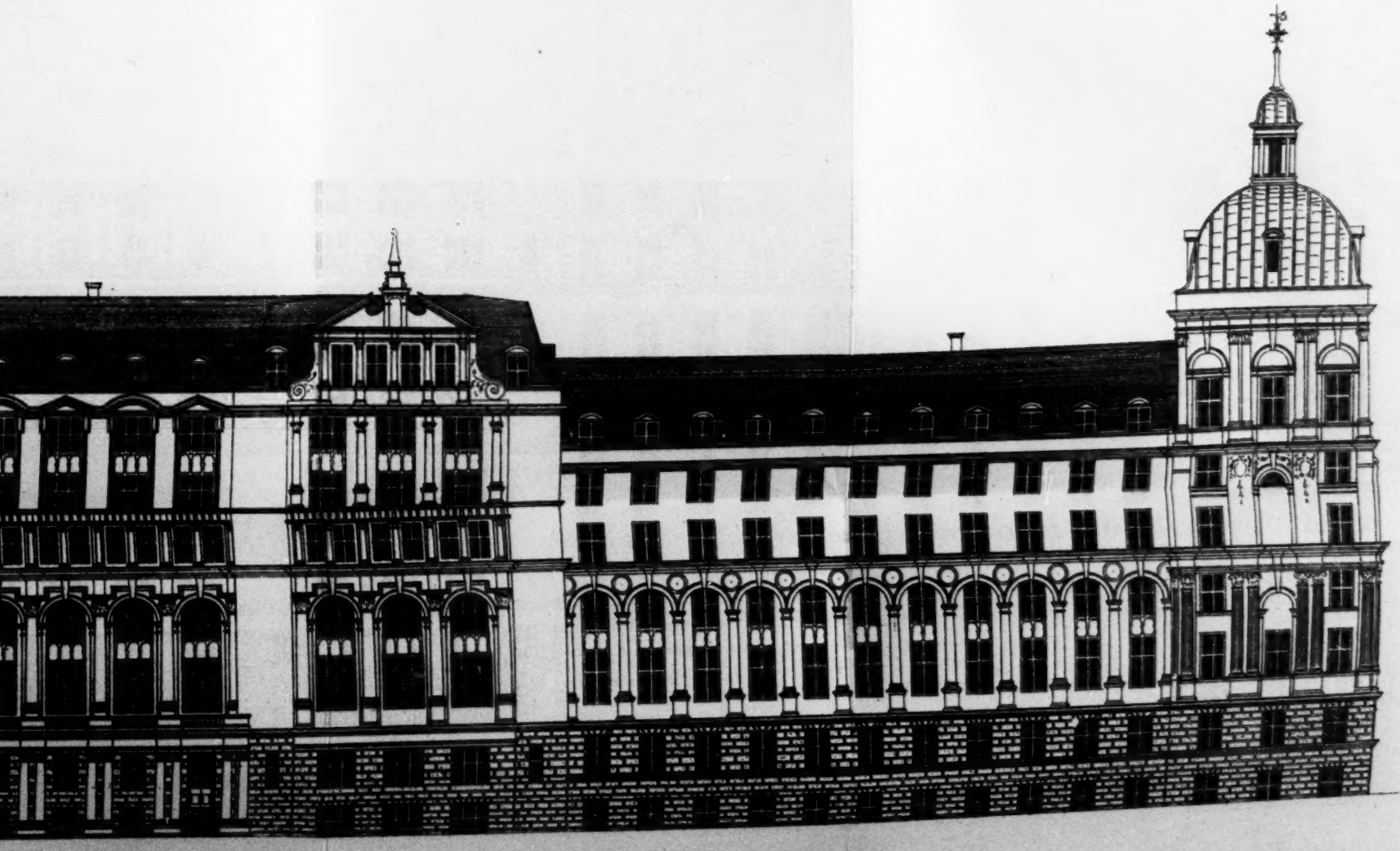


ENGINEER	3230
ARCHITECT	1035
SOLICITOR	1410
PUBLIC HEALTH	840
VALUER	855
LOCAL GOVERNMENT	1345
FIRE BRIGADE	660
TRANSPORT	1490
EDUCATIONAL ARCHITECT	1090
EXECUTIVE OFFICER	840
CHIEF INSPECTOR	630
MANAGER OF WORKS	850
SERVICE	300
TOTAL	64045

SCALE OF FEET



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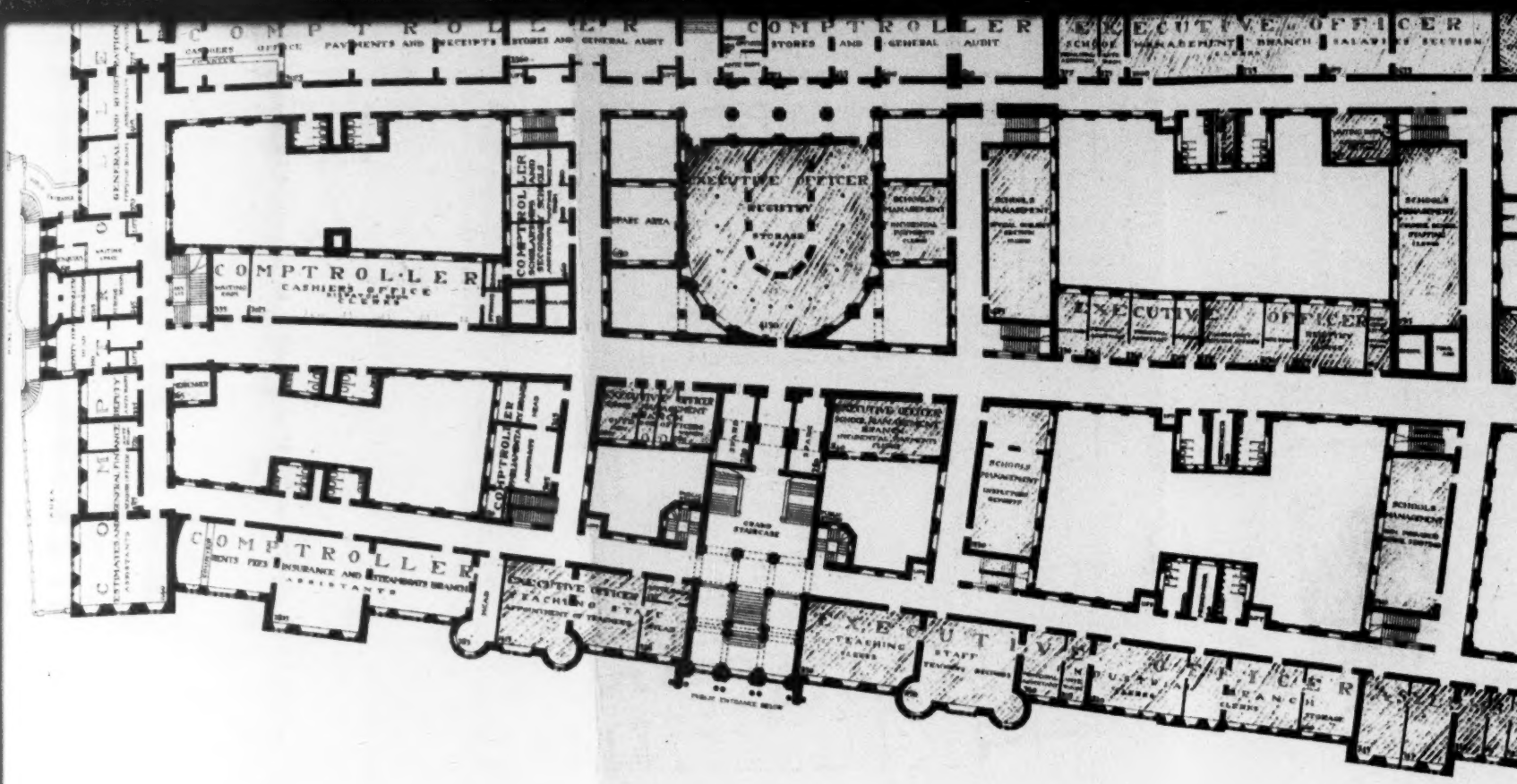
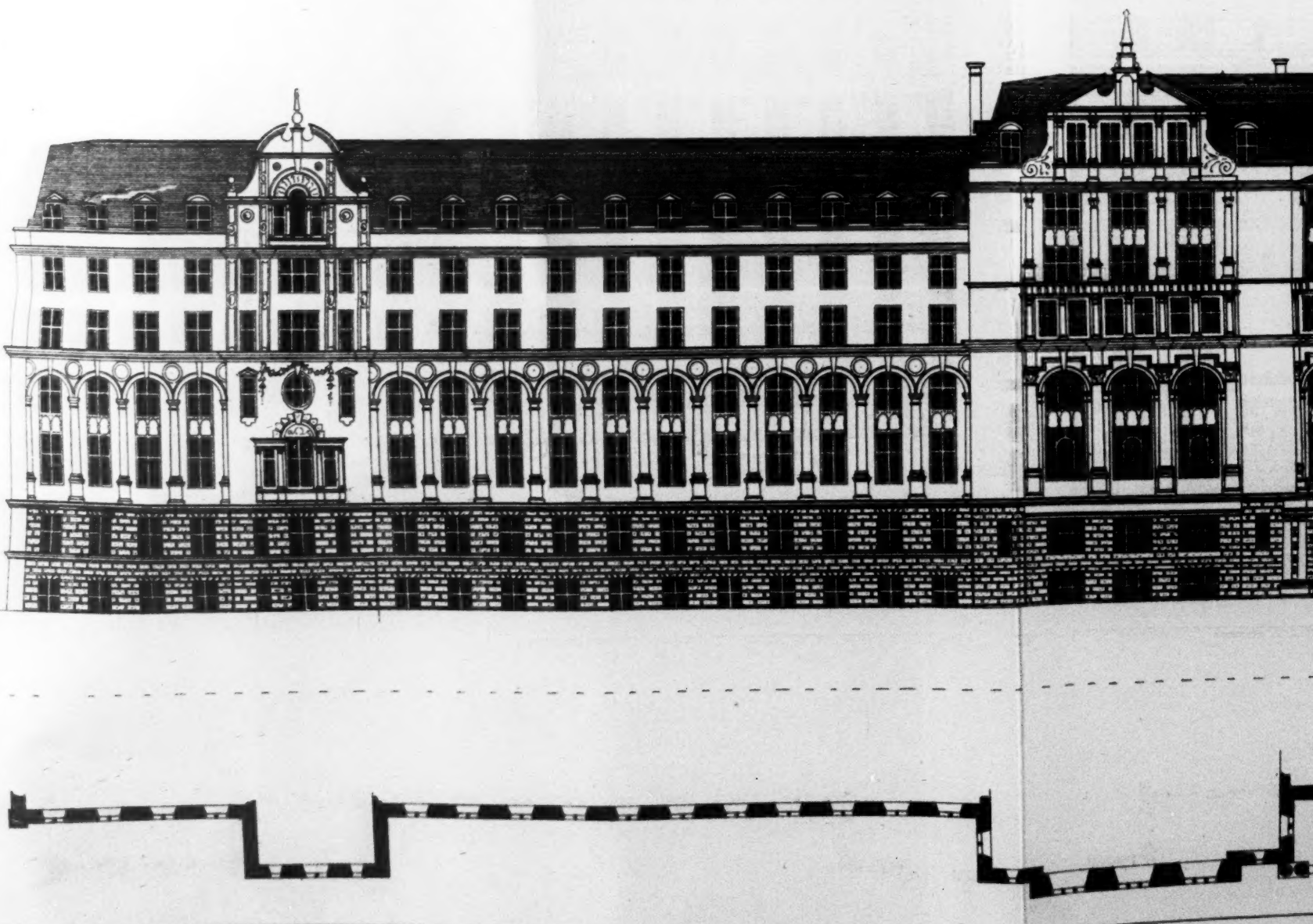
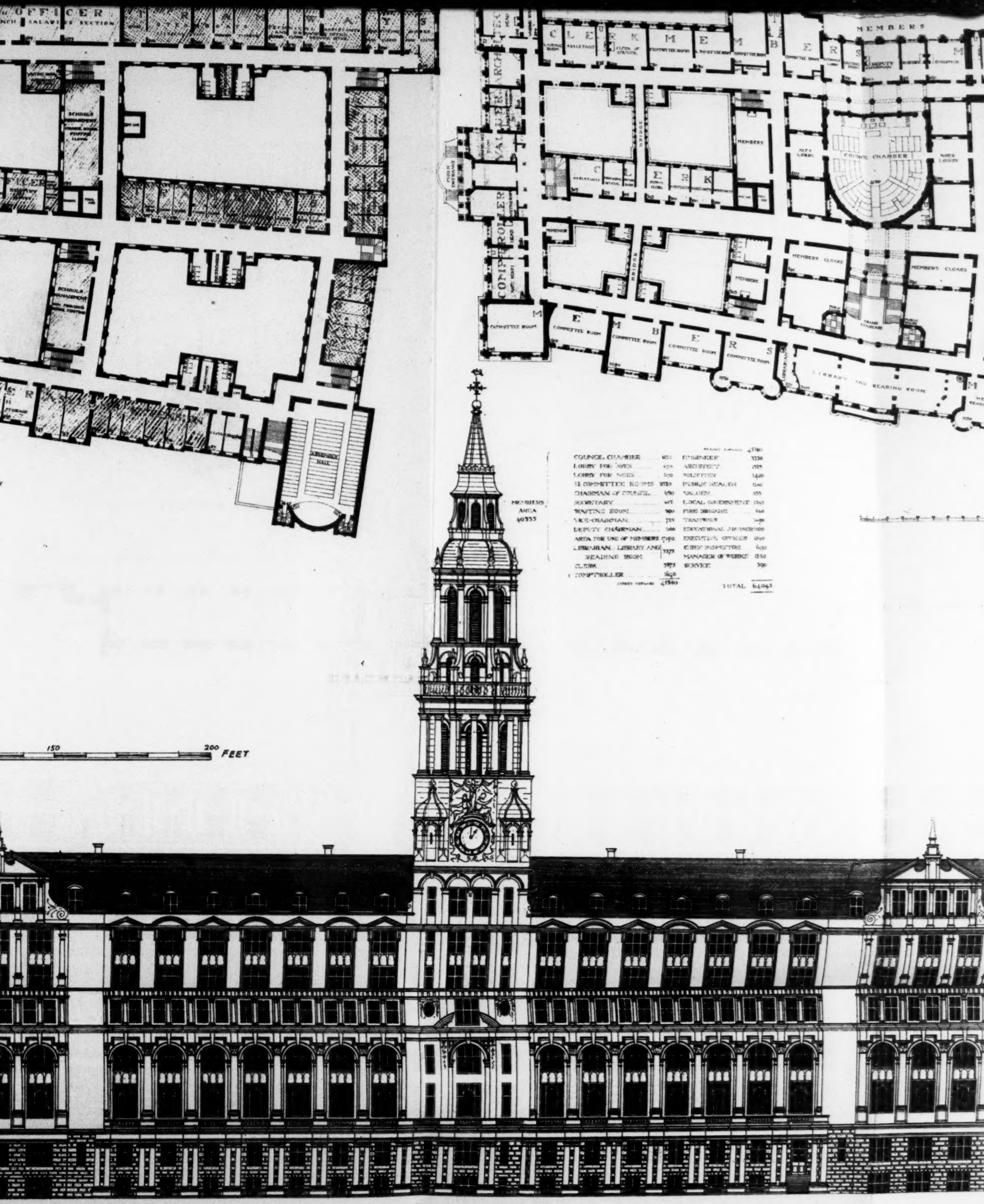
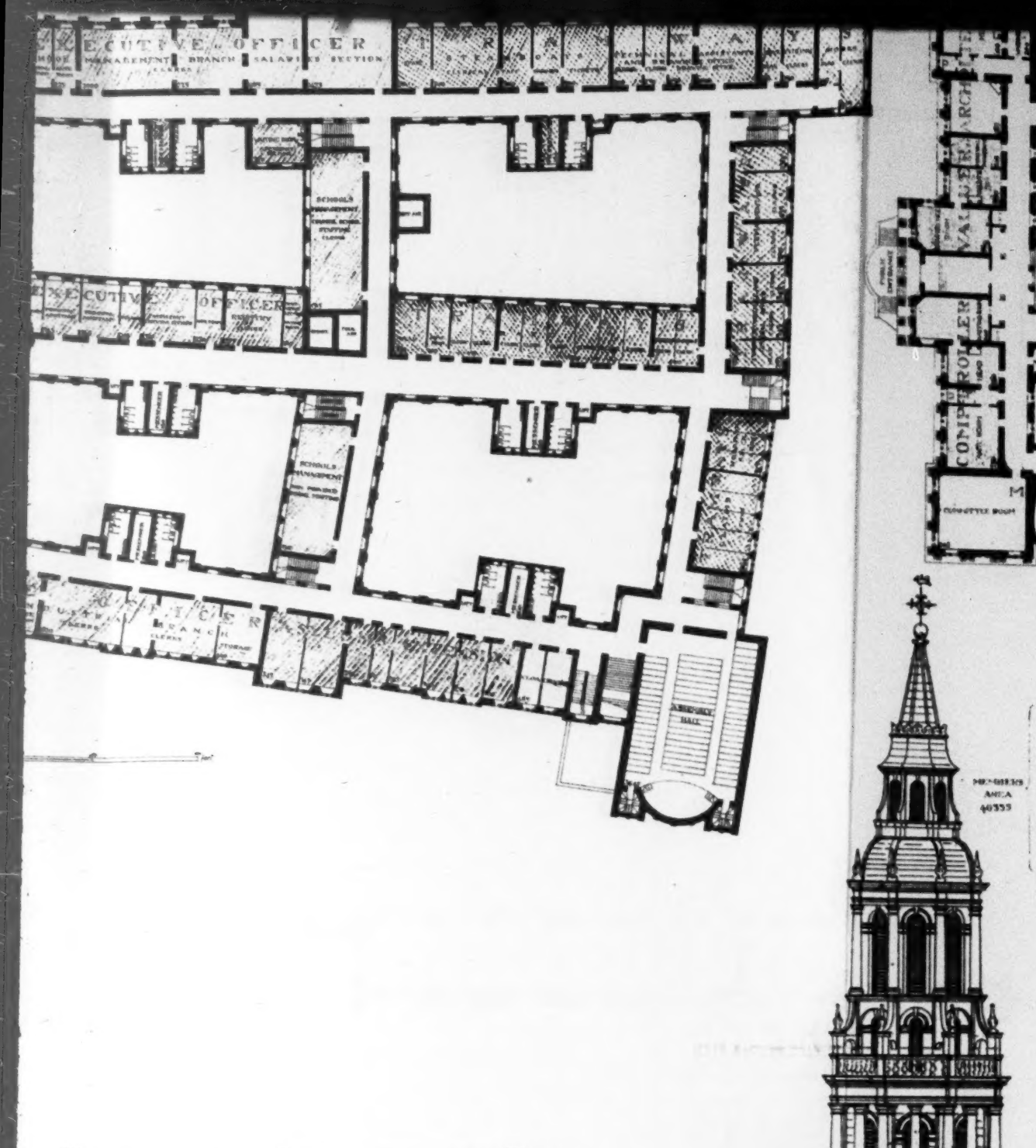






ELEVATION TO RIVER.

LONDON COUNTY HALL COMPETITION.—Design by Mr. T. G. Jackson, R.A.



COUNCIL CHAMBER	4[illegible]	ENGINEER	3230
LOBBY FOR AYES	470	ARCHITECT	1[illegible]
LOBBY FOR NOES	630	SOLICITOR	1440
11 COMMITTEE ROOMS	8820	PUBLIC HEALTH	840
CHAIRMAN OF COUNCIL	650	VALUER	8[illegible]
SECRETARY	4[illegible]	LOCAL GOVERNMENT	1365
WAITING ROOM	780	FIRE BRIGADE	840
VICE-CHAIRMAN	7[illegible]	TRAMWAYS	1470
DEPUTY CHAIRMAN	500	EDUCATIONAL AUTHORITIES	1050
AREA FOR USE OF MEMBERS	7[illegible]	EXECUTIVE OFFICER	840
LIBRARIAN, LIBRARY AND READING ROOM	3375	CHIEF INSPECTOR	600
CLERK	3[illegible]	MANAGER OF WORKS	1[illegible]0
COMPTROLLER	[illegible]	SURVEY	390
	43[illegible]		43[illegible]
		TOTAL	64043

MEMBERS AREA 40355

ELEVATION TO RIVER.

LONDON COUNTY HALL COMPETITION.—Design by Mr. T. G. Jackson, R.A.

MEMBERS

COUNCIL CHAMBER

MEMBERS CLOAKS

LIBRARY AND READING ROOM

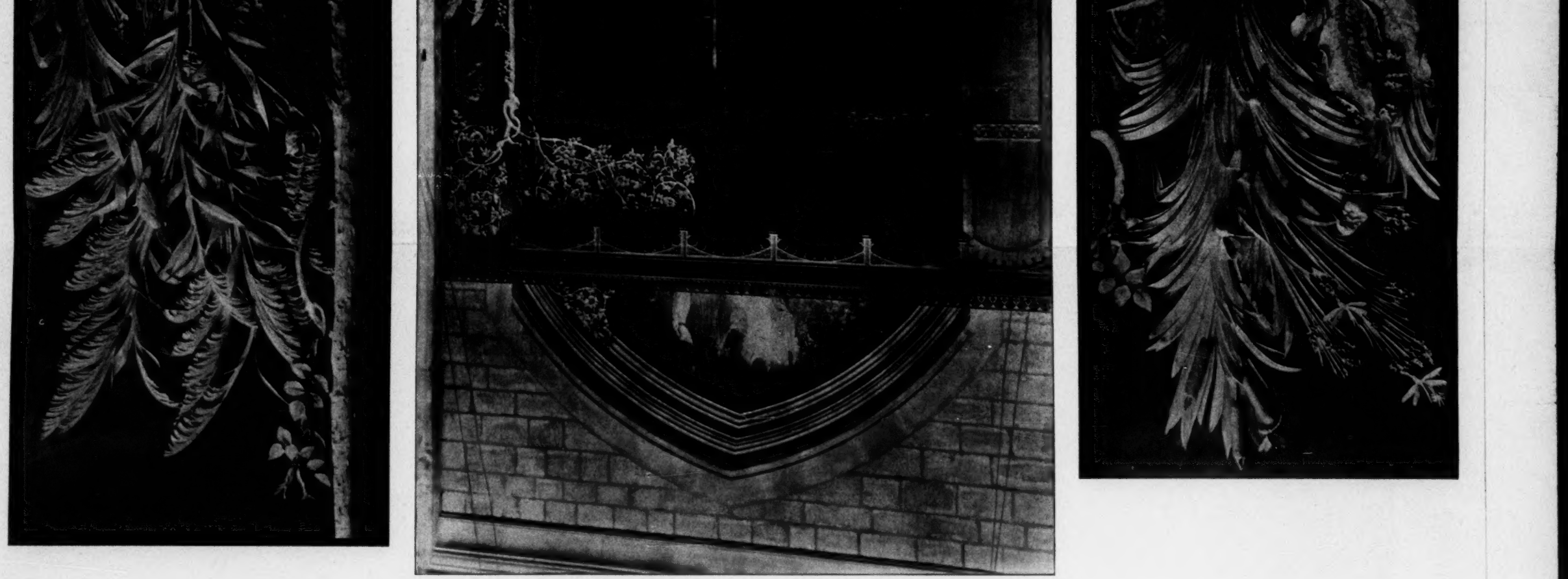
SOLICITOR LOCAL GOVERNMENT

ENGINEER

SCALE OF FEET

TOTAL 64045

PHOTO-LITHO. SPRAGUE & Co LTD 4 & 5, EASY HARDING STREET, FETTER LANE, E.C.



PAINTING UNDER ARCH: "THE GARDEN OF GETHSEMANE."—BY MR. EADIE REID.

H. Myers—scholar,
has left an abiding
knew him. We call

Sprague & Co., Ltd., Printers, 4 & 5 East Harding St., E.C.

MYERS MEMORIAL, CHELTENHAM COLLEGE CHAPEL.—Messrs. Prothero, Phillott & Barnard, Architects.

"PARKSIDE," ALBERT GATE.—Messrs. A. H. Hart, F.R.I.B.A., & L

* "INK-PHOTO" SPRAGUE & Co LTD 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

ART, F.R.I.B.A., & LESLIE WATERHOUSE, A.R.I.B.A., ARCHITECTS.

the monument unusual in an artistic sense, in that there is so large a use made of naturalistic carved foliage, a form of decorative art of which we do not in general approve. But as a kind of symbolism of Myers's love of nature it may perhaps be admitted as not out of place here.

The tree selected to symbolise the Tree of Life is a rose-tree, chosen in remembrance of the words in Myers's autobiography, where he speaks of the garden in the old home at Keswick thus:—"The thought of Paradise is interwoven for me with that garden's glory; with the fresh brightness of a great clump and tangle of blush roses, which hung above my head like a fairy forest, and made magical with their fragrance the sunny inlets of the lawn." The work is executed in sycamore wood by Messrs. H. H. Martyn & Co., of Cheltenham.

The wall-painting of the Garden of Gethsemane, beneath the head of the arch, is by Mr. Eadie Reid.

The monument is erected in the Cheltenham College Chapel. The work was carried out under the supervision of Messrs. Prothero, Phillott, & Barnard, architects, of Cheltenham; the monument being in fact a posthumous design of the late H. A. Prothero; the last work he designed before his death.

One portion of the carved detail, it may be noticed, is placed horizontally on the plate though vertical in its position in the general design; this is not from negligence, but because it was the only way to fit the various enlarged details into the space.

"PARKSIDE," ALBERT-GATE.

THIS large and important block of buildings, which occupies one of the finest sites in London for residential purposes, consists of forty-two suites of flats, with shops under. It adjoins the French Embassy, with one front to Knightsbridge, and the other to Hyde Park, with bays and balconies overhanging the park.

The design has been carried out in Lawrence's bricks, with Hartham Park stone dressings.

There are three principal entrances, with electric passenger lifts. The plan shows the general arrangement, all the rooms being well lighted with a minimum of corridor space. "Mack" partitions have been used generally throughout the building. It is heated centrally by hot-water from one furnace in the sub-basement.

The general contractors were the Waring White Building Company, whose contract was for completion within thirteen months from the date of possession of the site. The stone carving was executed by Messrs. H. H. Martyn & Co., Cheltenham; electric lifts by Messrs. R. Waygood & Co; the hot-water installation by Messrs. Rosser & Russell; and the electric lighting by Messrs. Rawlings Brothers. The bricks were supplied by Messrs. T. Lawrence & Sons, Bracknell; the "Mack" partitions by Messrs. J. A. King & Co.; and the ironmongery, etc., by Messrs. Chas. Smith, Son, & Co.

The building has been carried out from the designs of Mr. Alfred H. Hart and Mr. Leslie Waterhouse, of London.

THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of the London County Council was held on Tuesday in the County Hall, Spring-gardens, S.W., Mr. H. P. Harris, Chairman, presiding at the commencement of the proceedings.

New Chairmen.—The first business was the election of chairmen for the ensuing year, as follows:—As Chairman of the Council, Mr. R. A. Robinson; as Vice-Chairman, Mr. Whitaker Thompson; and as Deputy Chairman, Mr. A. A. Allen.

Loans.—It was agreed to lend Chelsea Borough Council 2,000*l.* for baths and washhouses and 4,786*l.* for a street improvement; and Woolwich Borough Council 3,000*l.* for purchase of electrical apparatus and wiring consumers' premises. Sanction was also given to Islington Borough Council to the borrowing of 6,935*l.* for electric lighting purposes.

Extension of Ruskin Park.—It was agreed that the estimate of expenditure on capital account of 12,200*l.*, submitted by the Finance Committee in respect of a contribution towards the cost of the acquisition of 12 acres of land adjoining Ruskin Park for the purposes of a public open space, be approved.

Schools.—It was agreed:—

That the estimate of expenditure on capital account of 355*l.*, submitted by the Finance Committee, in respect of taking out and lithographing quantities in connexion with the erection of a secondary school on the site in Ancona-road, Woolwich, for the accommodation of 476 girls, be approved.

That the estimate of expenditure on capital account of 3,600*l.*, submitted by the Finance Committee in respect of the acquisition of property adjoining the London County Council secondary school, Peckham, for purposes in connexion with the provision of permanent secondary school accommodation in the district, be approved.

Selected List of Contractors.—It was agreed that the resolution (*i*) of February 4, 1908, be rescinded so far as it relates to the removal of the name of Korting Brothers from the selected list of contractors to be invited to tender for heating apparatus in connexion with Council schools.

Resignation of a District Surveyor.—Mr. Edward Power, District Surveyor for the southern division of the City of London, has resigned his appointment. The resignation was accepted.

Laying-out Works and Adaptation of Buildings, Brockwell Park.—The Parks and Open Spaces Committee recommended, and it was agreed:—

That the estimate of expenditure on capital account of 740*l.*, submitted by the Finance Committee in respect of laying-out works, together with the adaptation of buildings, on the site of Clarence House, Brockwell Park, and adjoining grounds, and the estimate of expenditure on maintenance account in the financial year 1908-9 of 65*l.*, submitted by the Finance Committee under standing order No. B 359 in respect of repairs and painting work at the stables and cottage adjoining, be approved.

Parks.—It was agreed:—

That the offer of Sir Spencer Maryon-Wilson, Bart., to present to the Council for addition to Maryon Park two pieces of land, subject to the Council acquiring the property referred to, and providing suitable iron fencing thereto, be accepted; that the thanks of the Council be communicated to Sir Spencer Maryon-Wilson, Bart., for the gift.

That the estimate of expenditure on capital account of 970*l.*, submitted by the Finance Committee in respect of laying-out works at Springfield Park, be approved.

That the estimate of expenditure on capital account of 3,610*l.*, submitted by the Finance Committee in respect of the acquisition of the garden in West-square, Southwark, for use as a public open space, be approved.

Fire Dangers in School Buildings.—Mr. Reynolds moved the adjournment of the Council to call attention to the recent disaster in a school at Cleveland, Ohio, and said that many of the London schools were in such a condition that should a fire occur in them similar disasters would follow.—At a later stage, Mr. C. Jackson stated that for the last ten months a careful survey of the schools had been going on, and precautions had been taken which would prevent the possibility of a disaster similar to that which had been referred to.

County Hall.—The Rev. F. Hastings asked if the Establishment Committee was taking any steps to get a more original design than that which had been so far selected and which would be more worthy of London.—Mr. Hayes Fisher replied that the design was being overhauled, and undoubtedly there would be rearrangements before it was presented in its final form.

The Council adjourned soon after eight o'clock.

APPLICATIONS UNDER THE LONDON BUILDING ACT, 1894.

THE London County Council at their meeting on Tuesday dealt with the following applications under the London Building Act, 1894. The names of applicants are given between parentheses:—

Lines of Frontage and Projections.

Hammersmith.—A building upon the site of No. 5, Shepherd's Bush-green, Hammersmith, to abut also upon Woodstock-road (Mr. T. B. Whinney for the London City and Midland Bank).—Consent.

Kensington, South.—An iron and glass covered way in front of No. 25, Upper Phillimore-gardens, Kensington (Mr. W. Nash for Mr. E. H. Tootal).—Consent.

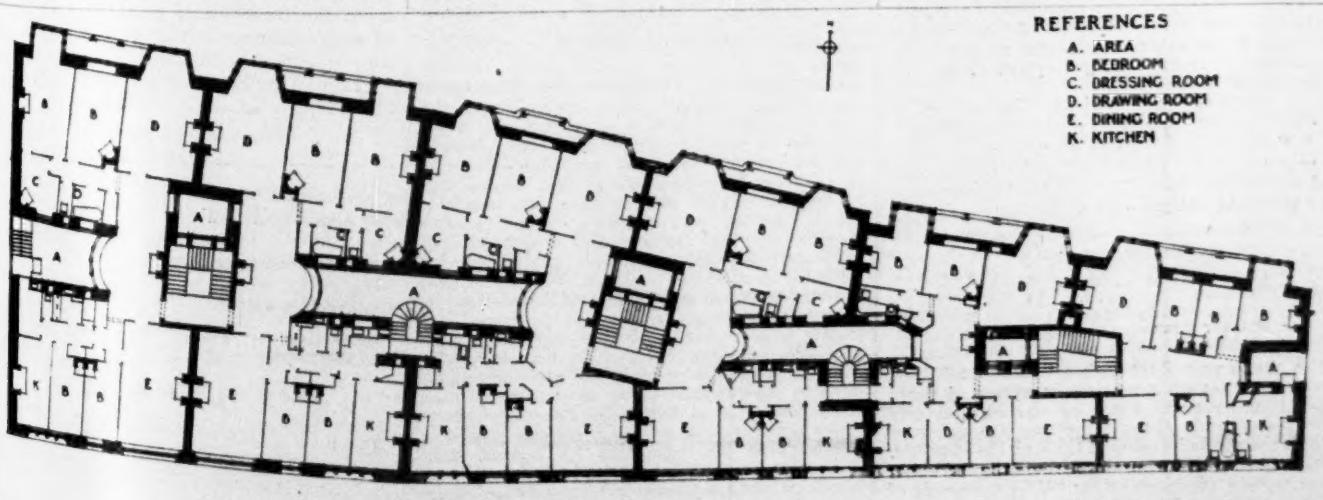
Lewisham.—Projecting one-story shops in front of Nos. 224 to 236 (even numbers only) inclusive, High-street, Lewisham (Messrs. H. Dartnell & F. Adams Smith).—Consent.

Lewisham.—Retention of a coal-office building on the eastern side of Burnt Ash-hill, Lee (Messrs. Wallace Spiers & Co.).—Consent.

Norwood.—Projecting one-story porches to seven houses on the north-eastern side of Herne Hill-road, Norwood (Messrs. H. & F. Gardner).—Consent.

Norwood.—Projecting one-story porches to eighteen houses on the north-western side of Finsen-road, Norwood (Mr. E. B. Ellis for Mr. Sergeant).—Consent.

Paddington, North.—A two-story projection, porch, balcony, and bay windows in front of Nos. 7, 7A, and 8, Maida-hill West, Paddington (Messrs. Boehmer & Gibbs for Mr. W. Stubb).—Consent.



"Parkside," Albert Gate.

Paddington, South.—A projecting hood in front of No. 5, Craven-hill, Paddington, and an alteration in the window of the porch (Messrs. Joseph & Smithem for Mrs. S. Lazarus).—Consent.

Strand.†—Projecting balconies on the Kingsway and Portugal-street frontages of the London Joint Stock Bank (Kingsway Branch) (Messrs. R. Creese Harrison & Son for the directors of the London Joint Stock Bank, Ltd.).—Consent.

Hammersmith.—A block of flats with projecting one-story shops in front, between Nos. 57 and 65, Shepherd's Bush-green, Hammersmith (Messrs. Palgrave & Co. for Mr. H. Diprose).—Refused.

Lines of Frontage and Construction.

Fulham.—The retention of a showcase on the forecourt of No. 754, Fulham-road, Fulham (Messrs. F. Stilliard & Co.).—Consent.

Width of Way and Line of Frontage.

Finsbury, East.—Buildings upon the site of Nos. 15 and 16, Cottage-lane, City-road, Finsbury (Mr. R. Peters for the Trustees of the late C. Hall).—Refused.

Width of Way and Construction.

Poplar.—A steel building at the Providence Iron Works, West Ferry-road, Millwall, to abut upon Devonshire-terrace at less than the prescribed distance from the centre thereof (Messrs. S. Cutler & Sons).—Consent.

Projection and Construction.

Hammersmith.—Three iron and glass shelters at the Shepherd's Bush Empire, Shepherd's Bush-green, Hammersmith (Messrs. F. Matcham & Co. for the Moss Empires, Ltd.).—Consent.

Formation of Streets.

Hammersmith.—An extension of the time within which the roadways of the portions of certain new streets out of the eastern side of Old Oak-road, Uxbridge-road, Hammersmith, were required to be defined and thrown open to the public (Messrs. Milles & Co. for the Ecclesiastical Commissioners).—Consent.

Wandsworth.—That an order be issued to Mr. W. C. Poole, sanctioning the formation or laying out of two new streets for carriage traffic to lead from Upper Tooting-road to Glenburnie-road, Wandsworth, and in connexion therewith the widening of a portion of Glenburnie-road (Mr. J. Watt).—Consent.

Alteration of Buildings.

Kensington, South.—A modification of the provisions of sect. 77 of the Act, so far as relates to the uniting of Nos. 7 and 9, Gloucester-road, Kensington (Messrs. Chesterton & Sons for Mr. S. W. Gatt).—Consent.

City of London.—A lavatory addition on the roof of No. 4, Bishopsgate-street Within, City (Mr. E. Parker).—Refused.

Hampstead.—The uniting of Nos. 18 and 20, Cricklewood-broadway, Hampstead (Mr. J. G. Briant).—Refused.

The recommendation marked † is contrary to the views of the local authority concerned.

Correspondence.

GAS AS AFFECTING STONEWORK.

SIR,—A suction-gas plant of about 150 to 200 h.p. is about to be put down at a distance of 150 yds. from a venerable church with a large tower, built of colitic limestone.

Will you or any of your readers kindly express an opinion on the possibility of injury resulting to the stonework of the church through the escape of suction-gas or any other emanations from the gas plant into the atmosphere?

Is anything known about the action of suction-gas on limestone? STONEWORK.

*** Suction-gas is made by drawing air and steam through a vessel filled with red-hot coke or anthracite. The following may be regarded as a typical analysis of suction-gas:—

Nitrogen	56	per cent.
Carbon monoxide	21	,,
Hydrogen	15	,,
Carbon dioxide	6	,,
Methane	1	,,
Sulphuretted hydrogen, Sulphur dioxide, Oxygen	1	,,

The gas is passed through a "scrubber" filled with coke having a continuous stream of water trickling over it. Some of the sulphuretted hydrogen and other impurities are removed from the gas in its passage through the scrubber, and the overflow water from the scrubber has a very offensive odour. The discharge of the overflow water into the drains sometimes creates an intolerable nuisance in the neighbourhood of the suction plant.

A considerable quantity of sulphuretted hydrogen remains in the suction-gas, and when this is burned it is converted into sulphur dioxide. Sulphur dioxide is, therefore, present in the waste gases discharged from the gas-engine which forms part of the suction-gas plant, and this compound when mixed with damp air has a destructive action upon any form of limestone. But we do not think that a suction plant to provide 200-h.p. and situated at a distance of 150 yds. from a limestone tower would injure the tower to an appreciable extent. Less damage would be done by a suction plant than by a steam plant to provide the same power, for a larger quantity of the injurious sulphur oxide would be discharged from the steam plant than from the suction plant. Less sulphur would be discharged from an engine worked with coal-gas than from a suction plant or steam plant, because all the sulphuretted hydrogen present in coal-gas is removed at the gasworks before the gas is distributed to consumers.—ED.

THEATRES.

SIR,—I should be obliged if you or any of the readers of your paper can give me any particulars as to size of stage, floor area of auditorium, holding capacity of same, number of tiers, and any other useful details concerning the Opera House of Paris, the great theatre at Wiesbaden, or any of the others of the largest of the European or American theatres. ROLAND COCK.

*** Our correspondent would be most likely to get the information he requires from Mr. E. O. Sachs's large work on Theatres and Opera-Houses, published by Messrs. Batsford. There is no doubt a copy of it in the library of the Institute of Architects.—ED.

THE LATE MR. DALE.

SIR,—I notice in the *Builder* the account of my late partner's death, but think it best to point out three slight mistakes. He was appointed District Surveyor for West Streatham December 17, 1880. He was member of Common Council for the Ward of Bishopsgate, not Billingsgate. He took me into partnership April 25, 1894. FRANKLIN GADSDON.

BOOKS RECEIVED.

MODERN BATHS AND BATH HOUSES. By W. Paul Gerhard, C.E. (New York: John Wiley & Sons: London: Chapman & Hall.)

MODERN PIGMENTS AND THEIR VEHICLES. By Frederick Maire. (New York: John Wiley & Sons: London: Chapman & Hall.)

ANALYSIS OF MIXED PAINTS, COLOUR PIGMENTS, AND VARNISHES. (New York: John Wiley & Sons: London: Chapman & Hall.)

The Student's Column.

REINFORCED CONCRETE BEAM FORMULÆ.—IX.

RECTANGULAR BEAMS WITH SINGLE REINFORCEMENT (*continued*).

(40.) *Summary of Formulæ.*—For convenient reference we summarise in Table IX. the formulæ whose derivation is traced in Section (38).

(41.) *Classification of Formulæ.*—Examination of Table IX. shows that equations (1) to (6a) can be divided into two groups:—

(I.) Giving values of x and "economic" values of ρ for predetermined or assumed values of c_c, t_s, and m.

(II.) Giving values of x for any values of ρ and m, values of c_c for any values of t_s, x, and m, and values of t_s for any values of c_c, x, and m.

In group I. the factors to be inserted in formula (1) are the permissible stress intensities for the concrete and the steel to be used and the ascertained ratio of the coefficients of elasticity of the two qualities of concrete and steel in question. Therefore x is a constant for given values of c_c, t_s, and m.

In formula (4) we must insert the same values as were used in (1), thereby obtaining the "economic" value of ρ, which also is a constant for the given values of c_c, t_s, and m.

In formula (5) we must insert the constant value of x as calculated by (1) and the value of m employed as a factor in (1). Then the value of ρ is the same as that given by (4) and is a constant for the given values of c_c, t_s, and m.

It does not matter what values of c_c, t_s, and m are first taken, but whatever they may be the same values must be used, as required, throughout the series of formulæ in group I.

In group II., formulæ (6) and (6a), give values of x which are not constant for any given qualities of concrete and steel, but vary with the value of the ratio ρ. Even if we use in (6) or (6a) the same value of m as in (1) the results will differ unless the value of ρ happens to be the same as that obtained by (4). The usefulness of (6) and (6a) depends chiefly upon the applicability of these formulæ to cases where the value of ρ is arbitrarily fixed.

Formulæ (2) and (3) are not placed in group (I.) because the values of c_c, t_s, and m are fundamental data in formula (1) and consequently have not to be calculated for that formula and formula (4).

But formulæ (2) and (3) are essential to group (II.) because after the value of x has been determined by (6) or (6a) with any value of ρ greater than that given by formula (4), either the value of c_c must be greater than the permissible stress for concrete in compression or the value of t_s must be less than the permissible stress for steel in tension.

Therefore for any value of x calculated with any value of ρ greater than that given by (4) if in (2) t_s be taken as the permissible stress intensity for steel, the calculated value of c_c will be greater than the permissible stress intensity for concrete, or if in (3) c_c be taken as the permissible stress intensity for concrete the calculated value of t_s will be less than the permissible stress intensity for steel.

Thus formulæ (1) to (6a) provide convenient means of calculating the values of factors for all essential conditions.

The results so obtained when applied together with given values for the other factors in (7) and (8) make it easy to determine the moments of resistance for beams of any dimensions, with concrete and steel

TABLE IX.—FORMULÆ FOR RECTANGULAR BEAMS WITH SINGLE REINFORCEMENT.

No.	Equation.	Definition of 1st Term.
(1)	$x = \dfrac{1}{1 + \frac{t_s}{c_c m}}$	*Depth of neutral axis / Effective depth of beam* $= \dfrac{kx}{h}$
(2)	$c_c = t_s \dfrac{x}{(1-x)m}$	*Compression in concrete, unit stress.*
(3)	$t_s = c_c \dfrac{(1-x)m}{x}$	*Tension in steel, unit stress.*
(4)	$\rho = \dfrac{1}{\frac{2}{c_c}\left(1 + \frac{t_s}{c_c m}\right)}$	*Area of steel / Effective area of beam* $= \dfrac{ph}{ba}$
(5)	$\rho = \dfrac{x^2}{2m(1-x)}$	*Do.* *Do.*
(6)	$x = \sqrt{(m\rho)^2 + 2m\rho} - m\rho$	(*See No.* 1.)
(6a)	$x = m\rho\left(\sqrt{1 + \frac{2}{m\rho}} - 1\right)$	*Do.*
(7)	$M_r = bh^2\left[\frac{1}{2}c_c x\left(1 - \frac{x}{3}\right)\right]$	*Moment of resistance about centre of tension in steel.*
(8)	$M_r = bh^2\left[t_s\rho\left(1 - \frac{x}{3}\right)\right]$	*Moment of resistance about centre of compression in concrete*

of any qualities and with any proportion of reinforcement.

(42.) *Application of Formulæ* (1) *to* (8).—By applying numerical values to the equations numbered (1) to (8) we see very clearly the interrelationship existing between them and obtain a good idea of the manner in which the formulæ can be employed for the practical design of beams.

In the subjoined examples the following values are assumed :—

c_c = 500 lb. per square inch.
t_s = 15,000 lb. per square inch.
E_c = 2,000,000 lb. per square inch.
E_s = 30,000,000 lb. per square inch.
$m = 15 (E_s \div E_c)$.

Example (1).—By formula (I).

$$x = \frac{1}{1 + \frac{t_s}{c_c m}} = \frac{1}{1 + \frac{15{,}000}{500 \times 15}} = 0{\cdot}3$$

This means that for concrete and steel of the given qualities and for the given working stresses the depth of the neutral axis from the upper surface of the beam is one-third the depth of the centre of the reinforcement from the same surface.

For other values of c_c, t_s, E_c, and E_s, the value of the ratio x would obviously be different.

In practice the designer must satisfy himself that the concrete and the steel to be used shall possess coefficients of elasticity corresponding to the values specified by him and employed as factors in his calculations ; or he must adopt in computation such values as fairly represent the coefficients of elasticity of the concrete actually employed.

This is a practical point which has nothing to do with the theoretical or mathematical aspect of formula (1).

Having calculated the value of the ratio x, we can demonstrate by formulæ (2) and (3) that the values of c_c and t_s bear a constant ratio one to the other for any given position of the neutral axis and for any given value of m.

Example (2).—When $c_c = 500$ lb. per square inch, and $x = 0{\cdot}3$ we have by (2)—

$$t_s = c_c \frac{(1 - x)\, m}{x} = 500 \frac{(1 - {\cdot}3)15}{{\cdot}3} = 15{,}000 \text{ lb. per square inch.}$$

Or when $t_s = 15{,}000$ lb. per square inch and $x = 0{\cdot}3$, we have by formula (3)—

$$c_c = t_s \frac{x}{(1 - x)\, m} = 15{,}000 \frac{{\cdot}3}{(1 - {\cdot}3)15} = 500 \text{ lb. per square inch.}$$

Next, by formula (4) we can ascertain the value of the ratio ρ in terms of c_c, t_s, and m, the values of c_c and t_s bearing the relation to one another that is adopted for formula (1) or is shown by formulæ (2) and (3).

Example (3).—Under the conditions now assumed, we get by (4)—

$$\rho = \frac{1}{\frac{2}{c_c}\left(1 + \frac{t_s}{c_c m}\right)} = \frac{1}{\frac{2 \times 15{,}000}{500}\left(1 + \frac{15{,}000}{500 \times 15}\right)} = \frac{1}{200} = 0{\cdot}005$$

Or the value of ρ may be calculated in terms of x and m, by formula (5) inserting the value of x found by (1).

Thus—

$$\rho = \frac{x^2}{2m(1 - x)} = \frac{{\cdot}3^2}{2 \times 15\,(1 - {\cdot}3)} = 0{\cdot}005$$

It should be noted that the value of ρ obtained by the use of formula (4) is the "economic" value, representing the most advantageous ratio between the cross-sectional areas of the concrete and the steel in a beam.

If the ratio be higher than that indicated by the formula in question the beam will be stronger in compression than in tension. This means that the compressive resistance of the concrete cannot be fully utilised without exceeding the permissible stress in the reinforcement.

On the other hand, if the ratio be lower than that indicated by the same formula, the beam will be stronger in tension than in compression. This means that the tensile resistance of the steel cannot be fully realised without exceeding the permissible stress in the concrete.

Nevertheless, cases often arise where it is necessary to use more than the economic proportion of reinforcement, so as to bring the total depth of beams within certain limits.

Consequently, we require a rule giving the value of x for any value of the ratio ρ. Such a rule is provided in formulæ (6) and (6a).

For the present series of calculations we retain the economic value $\rho = 0{\cdot}005$.

Example (4).—By (6) we get—

$$x = \sqrt{(\rho m)^2 + 2\rho m} - \rho m = \sqrt{({\cdot}005 \times 15)^2 + (2 \times {\cdot}005 \times 15)} - ({\cdot}005 \times 15) = {\cdot}416 - {\cdot}083 = {\cdot}3$$

and by (6a)—

$$x = m\rho\left(\sqrt{1 + \frac{2}{m\rho}} - 1\right) = {\cdot}005 \times 15\left(\sqrt{1 + \frac{2}{{\cdot}005 \times 15}} - 1\right) = {\cdot}083\left(\sqrt{1 + \frac{2}{{\cdot}083}} - 1\right) = {\cdot}083 \times 4 = {\cdot}3$$

GEORGIAN DOMESTIC ARCHITECTURE.

On Wednesday last week, at Carpenters' Hall, London-wall, E.C., Mr. Banister F. Fletcher lectured on this subject, Lord Balcarres presiding.

The lecturer remarked that the name "Georgian Architecture" was the title given to that style which was in vogue during the XVIIIth century in England. The style was of special interest because it was the English expression of the great Renaissance movement, as applied not only to the more grandiose building of the nobility, but also to the smaller houses in which the commonalty of the period dwelt. Its inception was largely due to the influence of Palladios's works, which were studied by Inigo Jones during his visits to Italy in the middle of the XVIIth century. On his return to this country Inigo Jones designed many important buildings in the purer Italian style—notably the Banqueting-house at Whitehall—and his influence created a greater interest in the works of the Italian Renaissance. The growth of the new style was further nurtured by Sir Christopher Wren, whose influences, with certain borrowings from the architecture of the Netherlands, led, however, to the construction of buildings essentially English in character. The style was traditional throughout the XVIIIth century, but gave way in the XIXth century to various styles of architecture—Greek, Gothic, Tudor, and Renaissance—which followed each other in quick succession. Some twenty years ago, however, there was a reintroduction of the XVIIIth century style, then called "Queen Anne," and since that period considerable interest in that special phase of art had resulted in the erection of buildings which exhibited the tendencies of the Georgian period adapted to modern requirements. A large number of houses were erected in that period for the middle classes, and London and almost every provincial town furnished examples, frequently occupied now by the country doctor or solicitor, while in many cases they had been transformed into boarding schools, museums, or the like. The period was, *par excellence*, one in which, owing to the recognition and patronage of architecture by the nobility, a large number of palatial mansions were constructed wherein symmetry overruled all ideas of convenience, although no one could deny that the result had given us buildings of considerable grandeur. The lecturer then described a number of examples of domestic architecture of the period, illustrating his remarks by lantern photographs. Among the smaller houses he dealt with were the house in the close at Salisbury, the house in High-street, Wallingford, and Eagle House, Mitcham, Coming to accommodation of the larger type of house, the lecturer mentioned as examples Eltham House, Kent; Groombridge Place, Kent; Melton Constable, Norfolk; Honington Hall, Warwickshire; Widcombe Manor, near Bath; and Bolton House, near Grantham. Blenheim Palace, erected in 1715 from the designs of Sir John Vanburgh, was then described at some length, the lecturer remarking that it was undoubtedly the most magnificent private palace ever built, but convenience had been sacrificed to symmetry. The kitchen, for instance, was 100 yds. from the nearest dining-room. Speaking of Marlborough House, London, the lecturer said that the Pall-mall entrance was very cramped, and that the widow of the Duke of Marlborough had endeavoured to make this more commodious by purchasing land in front, when Sir Robert Walpole, in order to vex her, bought the land for himself. The blocked-up archway proposed for the new entrance still existed in front of the main entrance of the house proper, and formed a screen to the back windows of the Pall-mall houses. Kensington Palace, the last of the larger mansions described, was, said the lecturer, transformed by Sir Christopher Wren in 1687 to 1691, into a residence for William and Mary. It was formerly known as Nottingham House. The south front indicated the quiet treatment of Wren's work. In conclusion, the lecturer said that the period had bequeathed to us a large number of structures which gave food for thought. The smaller buildings possessed an air of homely comfort often wanting in modern houses of more pretentious design, while the larger buildings exhibited a stateliness and grandeur well suited to their purpose.

THE LICENSING OF WOODEN STRUCTURES IN LONDON.

THE Law and General Purposes Committee of Kensington Borough Council issued an important report on Monday in regard to the licensing of wooden structures. They say:—We have considered as to the powers of the Council in regard to the licensing of wooden structures under sect. 84 of the London Building Act, 1894, and may, in the first place, allude to the various provisions contained in part 7 (sects. 82 to 86) of the Act which govern "Special and Temporary Buildings and Wooden Structures." Sect. 82 provides that "where a builder is desirous of erecting an iron building or structure, or any other building or structure to which the general provisions of part 6 of this Act are inapplicable, or, in the opinion of the Council, inappropriate, having regard to the special purpose for which the building or structure is designed and actually used, he shall make an application to the Council," etc. The section also provides that "the Council shall not authorise any building of the warehouse class to be erected of greater cubical extent than 250,000 cubic ft., except in accordance with the foregoing provisions of the Act." Sect. 83 provides that "where an application is made to the Council by any person stating his desire to erect in any place an iron or other building to which the general provisions of part 6 of this Act are inapplicable, the Council may, if they approve of the plan, limit the period during which it shall be allowed to remain," etc. Sect. 84 provides that no person shall set up in any place any wooden structure (unless it be exempt from this part of the Act) except hoardings enclosing vacant land, and not exceeding 12 ft. in height, without having first obtained for that purpose a licence from the Council. . . . ." By sect. 201 of the Act it is provided *inter alia* that the following shall be exempt from the operations of part 7 of the Act:—"Buildings not exceeding in area 30 sq. ft. and not exceeding in height 5 ft. in any part measured from the level of the ground to the underside of the eaves or roof plate, and distant at least 5 ft. from any other building and from any street, and not having therein any stove . . . provided that no portion of the building extends beyond the general line of buildings in any street." The powers contained in sect. 84 of the Act were transferred from the County Council to the borough councils by the London Government Act, 1899. No definition of the word "building" or the word "structure" is given in the Act, and, although the point was somewhat fully discussed in the case, Westminster Corporation *v.* London County Council (1 K. B., 1902—326), the Lord Chief Justice, in giving his decision, expressly stated that he confined his answer to the question then raised, viz.:—Whether wooden structures erected for the purpose of viewing public processions in the streets came within the provisions of sect. 83 or sect. 84 of the Act, and did not wish to lay down any general rule which would cover cases of a somewhat different description. It may be mentioned that the judges decided in favour of the Westminster Corporation, and, in the course of his

remarks, the Lord Chief Justice stated:—"As far as I can see, sects. 82 and 83 were intended to apply to structures which would ordinarily have been supposed to come under part 6 of the Act, but as to which, either from their construction or intended use, it was thought by the County Council that the general provisions of part 6 were inapplicable. Sect. 24, as it now stands, seems to be a section giving control over wooden structures to which no general provisions or substituted provisions of a general character would be applicable." He further stated:—"I think that the London Government Act recognised that matters which ought to be dealt with by a central body, and could be the subject of substituted regulations in place of the general provisions of part 6, should be dealt with by the County Council, but that local matters, such as the erection of wooden structures for a limited time, to which no general or substituted regulation could be intended to apply, should be transferred to the borough councils. In a case heard by Mr. Fordham at the North London Police-court on May 5, 1903, the defendants had erected, under licence from the borough council, a wooden structure 40 ft. by 30 ft. covered with felt, and it contained a combined boiler and engine with an iron chimney-shaft. The London County Council contended that the building came under sects. 82 and 83 of the Act, and this view was accepted by the magistrate, who ordered the demolition of the building. In connexion with our consideration of the reference, our attention has been drawn to a communication addressed to the Council by the Clerk of the London County Council on January 3, 1901, in which they set forth their practice in connexion with the licensing of wooden structures and sky-signs. In this communication the following paragraph appears:—"With regard to the transfer of powers under sect. 84 of the London Building Act, 1894, I may state that it is not clear to the Council what constitutes a wooden structure within the meaning of the section. The Council is advised that a structure, the enclosures and roof of which are constructed wholly of wood, but the covering of the roof of some material other than wood, may be deemed a wooden structure if of the size and character to come within the scope of sect. 34. In explanation, I may say that a chapel, the enclosures and frame of the roof of which are of wood, but the roof covered with corrugated iron, would not, according to this opinion, be a wooden structure within the meaning of sect. 84, but would come under the sects. 82 or 83." Whilst it will be seen that the powers of the Council in regard to the licensing of wooden structures are not clearly defined, it appears to us that the Council through their Works Committee should, as heretofore, deal with any application which may be submitted to them, and if the structure is not of excessive dimensions, and the purposes for which it is intended to be used do not *primâ facie* indicate that it is one to which the provisions of part 6 of the Act should be applied, they should regard the case as coming within the provisions of sect. 84 of the Act, and exercise their discretion as to the issuing of a licence in respect thereof.

WESTMINSTER CITY COUNCIL.

AT the fortnightly sitting of the Westminster City Council on Thursday last week the following matters were dealt with:—

Street Repairs.—It was agreed to repair Ennismore-gardens with macadam at a cost of 113*l.* The Improved Wood Pavement Company intimated their intention of repaving the carriage-way in New Bond-street and Old Bond-street under their maintenance contract.

Overhanging Signs.—It was agreed that the Council do again urge upon the London County Council the necessity for by-laws for the regulation of lamps, signs, and other structures overhanging the public way, to be made by the London County Council, pursuant to sect. 164 (1) of the London Building Act, 1894, and do express the hope that the County Council will see their way to make by-laws accordingly.

Generating-station.—Messrs. J. Mowlem & Co. had asked approval of the plans of vaults, pavement lights, drains, etc., at the new building to be erected for the purpose of a generating-station for the Westminster Electric Supply Corporation in Horseferry-road. As the level of the lowest floor of the premises would be in contravention of the provisions of the Metropolitan Management Act, the plans had to be disapproved, except as regarded the pavement lights, but the contractors had the right of appeal to the London County Council.

Wardour-street Improvement.—It was agreed to purchase the freehold interest in No. 109, Wardour-street for 3,000*l.* for the widening of the thoroughfare.

Annual Contracts.—The Contracts Special Committee reported the result of their consideration of the question of the revision of the contract forms. In the case of painting in connexion with open spaces, lamp-posts, public conveniences, and tree-guards, it was recommended that in future, instead of there being annual contracts, quotations be obtained as required. It was recommended that in the case of forms for materials required for different committees the quantities be amalgamated. The form of tender for paving works, other than general repairs, would be revised after the completion of the preparation of the annual tender forms, and the Committee had, therefore, deferred the revision of the specification and schedule for supply of wood-paving blocks in order that it might be considered with the paving works' form.

THE BOROUGH ENGINEER AND WORKMEN.

IN regard to the suggested advisability of all employees who have been in the service of the Kensington Council for more than five years having the right of direct appeal to the respective committees under whom their work is done, the Borough Engineer has reported that the Council pays a labour bill amounting to upwards of 45,000*l.* per annum, and the return made to the Borough for this outlay is a matter which engages his constant attention. Twenty-five years' experience of work and workmen under "contract," as well as under "direct labour" conditions has, he says, convinced him that the more direct and the more obvious to the workman control of labour is, the better is the return made for a given outlay. If a group of workmen know that the official who is with them all day long overlooking their work has the power to discharge any man for the sole reason that, in his (the foreman's) judgment, the man is not earning his money, that group of workmen will give more in return for the wage paid than they will if the arbitrary authority over them is less in evidence. If, continues the Engineer, he were a borough contractor entitled to receive from the Council for the amount of work now done the sum now paid for labour, he would place arbitrary authority over the labour employed in the hands of the responsible foremen (taking care that they were men worthy of this trust), look to results, and secure, he is confident, a handsome profit. The system of supervision obtaining over the regular staff in Kensington gives in the last resort arbitrary power to the Borough Engineer alone. The superintendent of the work has the right to engage and discharge labour as required for the work of the borough, but any workman suspended or discharged for alleged misconduct or breach of rules can appeal to the Borough Engineer. A committee, observes the Engineer, is impersonal, and if certain workmen are given the right of appeal to a committee instead of to the Borough Engineer, the control of these workmen will be less direct, less personal, than it is even now, and the return made will suffer. The real interests of labour and the interests of the ratepayers are fundamentally identical, and, in his judgment, it would be to the best interests of both, rather than to curtail the Borough Engineer's authority, to authorise him to depute, at his discretion, such arbitrary authority to subordinate officers who are by the nature of their duties in closer touch with the labour employed in the borough. Practically, says the Engineer in conclusion, the suggestion means indirect control of direct pay, an expensive combination. After consideration of the report, the Works Committee has decided that it would not be advantageous or advisable to give effect to the proposal in question (the giving of right of appeal to committees), and that no action should be taken in the matter.

Appointment.

WESTON-SUPER-MARE.—Mr. Harold Brown, of Fulham, has been appointed to the Chief Engineer and Surveyorship of Weston-super-Mare. There were 302 applicants for the post.

Stained Glass & Decoration.

MEMORIAL WINDOW, LLANLLECHID.—An east window, designed by Sir E. Burne Jones, in memory of the late Lord Penrhyn, was recently unveiled at St. Cross Church, Llanllechid. The centre light of the window, which was executed by Messrs. Morris & Co., represents Our Lord as crucified upon the Tree of Life. On the north light is the figure of the Virgin Mary, and on the south light the figure of St. John is depicted.

General Building News.

ROMAN CATHOLIC CHURCH, ST. IVES.—The Roman Catholics of St. Ives are erecting a new church at a total cost of nearly 4,000*l.* The architects are the Rev. Canon Scoles and Mr. G. Raymond, of Basingstoke.

CHURCH ADDITION, NEWBURY.—A room for meetings, etc., has been erected in connexion with the Congregational church in this town. Mr. Walter H. Bell, architect, of Newbury, prepared the plans, and Messrs. Hedges Brothers, of Newbury, were the contractors.

BAPTIST TABERNACLE, BOURNEMOUTH.—The Baptist fraternity at Upper Parkstone have now entered into possession of their new Tabernacle, which stands at the junction of Ashley and Lake roads. The building has cost about 4,500*l.*, seating about 750 people, and capable of being extended to accommodate about 900. It is built of red brick and Bath stone. The vaulting of the roof is timbered, the floor is of wood block with ordinary boarding under the seats, the pewing being of pitch-pine wood. The windows are glazed with lead lights, the lighting is the inverted incandescent gas, and the heating (hot water) and ventilation have been carried out in accordance with a plan prepared by Messrs. Haydon & Son, of London. The architects were Messrs. Lawson & Reynolds, of Bournemouth, the builders Messrs. Jones & Seward, of Westbourne, while the masonry work was executed by Messrs. J. W. Mannell & Co., of Bournemouth West.

COUNCIL SCHOOLS, STOKESLEY.—The North Riding Education Authority have opened new schools at Stokesley. The buildings are of red brick, the covering of Welsh slates, and are of the central-hall type, provide accommodation for 300 children in six classrooms. The buildings have been designed by Messrs. J. M. Bottomley, Son, & Wellburn, of Middlesbrough and Leeds, and the contractor for the whole of the work was Mr. Henry Bainbridge, of Hutton Rudby. Mr. Billington was the clerk of the works.

WESLEYAN SCHOOLROOM, HEBBURN.—A schoolroom has been built in connexion with the Wesleyan Mission Chapel, Jervis-street, Hebburn. The building has been executed from designs by Mr. Fred Rennoldson, South Shields, the contractor being Mr. D. Glen, Jarrow.

INSTITUTE AND SUNDAY-SCHOOL, BIRMINGHAM.—A new institute and senior Sunday-school are to be erected on a site adjoining the Islington Church, Birmingham. The architect is Mr. Ewen Harper.

WESLEYAN MISSION-HALL, SALTASH.—The new Albert Mission Hall, Saltash, has just been opened. The building has brick walls, covered externally with cement, with Portland stone dressings at the base. There is a vestry-room, kitchen, and provision for supplying hot water for heating the premises. The ventilation is on the Fletcher system, and lighting is by suspended incandescent burners. Messrs. W. H. Pike and J. H. Pooley were the architects, and the contractor was Mr. W. H. Rothery.

FREE LIBRARY, HENDON.—The foundation-stone has just been laid of the new free library at Hendon, one of the three Sunderland branch libraries which are to be erected and fitted out of the 10,000*l.* grant from Mr. Andrew Carnegie. The building is planned on the open-access system. The walls will be built of Ormesby bricks, with Windy Nook stone dressings, and the roof will be covered with blue Welsh slates. The floors of the main rooms will be laid with maple wood blocks. The more important joinery will be executed in oak. The building has been designed and is being carried out under the supervision of Mr. Edward Cratney, architect, for Messrs. Davidson & Cratney, of Wallsend and Sunderland, whose designs were accepted in competition, the contractor being Mr. Joseph Huntley, and the stonemasons Messrs. McMillan & Son, both of Sunderland, and the carving will be executed by Mr. Christian Neuper, of Newcastle. The clerk of works is Mr. F. Cooke. The cost of erecting and fitting the building is estimated at 3,300*l.*

PROPOSED EXTENSION OF THE CHELMSFORD INFIRMARY.—Mr. Keith Young, architect, has prepared plans for the extension of the Chelmsford Infirmary and Dispensary. The scheme will involve an expenditure of over 5,000*l.*

PROPOSED WORKING-CLASS DWELLINGS, BLACKROCK, CO. DUBLIN.—The Blackrock Urban Council have adopted the plans prepared by their Surveyor providing for the erection of twenty-two houses for working men on a site in George's-avenue, at a cost of 4,300*l.*, and are applying to the Local Government Board for sanction to raise a loan for this purpose.

ESTATE DEVELOPMENT, WOLVERHAMPTON.—The development is being proceeded with of the Fallings Park estate, on the borders of Wolverhampton, and the first lot of cottages erected by "Garden Suburb Tenants" has just been

completed. The cottages were erected from the plans of Mr. W. J. Oliver, architect, of Wolverhampton.

LADY MARGARET HALL, OXFORD.—A fund is opened for the building, at an estimated cost of 11,000*l.*, of a new library, dining-hall, and additional rooms for resident students. The buildings for the hall, founded in 1879, were planned and designed by Mr. Basil Champneys.

THEATRE, BIRKENHEAD.—The plans of the King's Theatre, Grange-road, which it is proposed shall take the place of the old Theatre Metropole, have been approved. The architect is Mr. William Ward, and the work is estimated to cost between 6,000*l.* and 7,000*l.*

PROPOSED MUNICIPAL OFFICES, BETHNAL GREEN.—Mr. H. Shelford Bidwell, on behalf of the Local Government Board, recently held an inquiry at the Bethnal Green Town Hall into an application of the Borough Council for an order to acquire a site in Cambridge-road for a new town hall, Council-chamber, committee-rooms, and offices. Mr. E. V. Finch, the Borough Engineer, said that the site was estimated to cost 8,600*l.*, and the buildings, including furniture, 22,100*l.*, a total of 30,700*l.*

MEMORIAL PORCH, ALL SAINTS, CLIFTON.—It is proposed to erect a porch at this church at a cost of 1,400*l.* as a memorial to the late Rev. R. W. Randall. The designs were prepared by the late Mr. G. F. Bodley, R.A.

ENTERTAINMENT HALL, HULL.—A scheme of alterations and improvements is to be carried out at the building known as the Victoria Hall in George-street Hull. Mr. Gaskell, architect, has prepared the plans.

TRADE NEWS

MESSRS. PATMAN & FOTHERINGHAM have obtained the contract for large and extensive alterations and additions to the Albemarle Club: Messrs. Smith & Brewer are the architects.

Messrs. Robert McAlpine & Sons, contractors, of Glasgow and London, have recently secured two important contracts. One is for the construction of a new dock for the British Railway Company at Methil, Fifeshire. The contract sum is approximately half a million, the time to be taken three and a half years, and the engineers Messrs. Blyth & Westland. The other is a large factory at Kinlochleven, Argyllshire, for the British Aluminium Company, Ltd., and reinforced concrete on the Coignet system will be employed very largely in its construction. It is being built under the superintendence of Mr. W. Murray Morrison, Technical Adviser, and Mr. Alban Scott, Architect to the company. The total cost of the factory and its appurtenant works will not fall far short of 100,000*l.*

Messrs. A. W. Penrose & Co. have been entrusted with the contract to supply and erect one of their variable speed electric express lifts in the Imperial Tower at the Franco-British Exhibition, with a carrying capacity of twenty persons. They hope to be able to do the journey of about 120 ft. in at most fourteen seconds. The motors, gearing, and controlling apparatus will present many novel and interesting features, both electrically and mechanically.

The United Kingdom Fireproofing Company have secured the following contracts:—The whole of the fireproof floors for Salford Royal Infirmary; for Epps' cocoa factory extensions; and for Cambridge Telephone Exchange.

Sanitary and Engineering News.

MORECAMBE SEWERAGE.—The third section of the Morecambe sewerage scheme has been completed at a cost of 3,872*l.* 8s. 7d., which includes the sum of 483*l.* 11s. 7d. for additional works in Church-street and Torrisholme. The works comprise 9-in. and 12-in. sewers in Queen-street, Morecambe-street, Clarence-street, Church-street, Carlton-terrace, and Torrisholme, with requisite manholes, etc., and ventilating shafts, and includes the various connexions from the old to the new sewers. The works have been carried out from the plans and under the supervision of the engineers, Messrs. Beesley, Son, & Nichols, MM.Inst.C.E., of Westminster, the contractors being Messrs. Dean, Ltd., of London, W.C. The engineers' estimate amounted to 3,515*l.*, and the works have been completed for the sum of 3,388*l.* 17s., a saving of 226*l.* on the engineers' estimate. Additional works to the amount of 483*l.* 11s. 7d. were carried beyond those confirmed in the scheme, bringing up the total cost to 3,872*l.* 8s. 7d.

PROPOSED SEWERAGE WORKS, NORWICH.—A public inquiry was held at the Guildhall, Norwich, on the 2nd inst., by Mr. A. E. Sandford Fawcett, Local Government Board Inspector, in respect of the application by the Norwich Town Council to the Local Government Board for permission to borrow 14,800*l.* for the purpose of sewerage works at Eaton. The City Engineer, Mr. A. E. Collins, in explaining the scheme, said it was proposed to carry out the sewerage works on the separate system. The present population of Eaton was 1,000, and the sewerage scheme was calculated to accommodate 6,000. There would be ventilating columns at every 100 yds., each not less than 36 ft. high. The Roturbo pumps it was proposed to instal would be capable of delivering up to 400 gallons per minute each, or 800 gallons the two. The scheme also embraced a surface-water drain.

BEAMINSTER WATERWORKS. — Beaminster (Dorset) has just inaugurated a new water supply. In the first instance a borehole was sunk into the chalk about two miles from the town in a north-easterly direction above Langdon Farm. The geological formation at this point is chalk with underlying upper greensand, and these porous strata are based on the fuller's-earth clay. The borehole was driven down to a depth of 70 ft., and water was met with 37 ft. from the surface. The yield from the borehole was tested by means of a siphonic arrangement leading to the base of the hill, where a gauge-box was constructed, and the daily discharge amounted to 77,760 gallons. An adit 5 ft. high by 3 ft. wide was constructed from the base of the hill, partly in open cutting and partly in tunnel, driven in the direction of the borehole for a distance of 168 ft., of which 162 ft. 6 in. is constructed of brickwork on a concrete foundation. When completed the discharge from the adit averaged 92,000 gallons per day, a considerable increase on the yield from the borehole. Analysis of the water prove it to be of excellent quality, rather hard, as might be expected from its source, but entirely free from all organic contamination, and therefore well adapted for a public water supply. The daily requirements are estimated at 25,500 gallons, based on a population of 1,700. A gauging-chamber is constructed at the lower end of the adit, with overflow pipes, and a 4-in. supply pipe is laid for a short distance down the valley to the covered service reservoir, which has a capacity of about 76,000 gallons. The reservoir is fitted with overflow and washout pipes and floating arm for drawing off the water a little below the surface. The depth of water is 10 ft. The supply main to the town is 4 in. in diameter, and the service mains throughout are 3 in. in diameter, fitted with all requisite sluice and air valves and hydrants. There is a pressure of about 315 ft. over the Market-square when the reservoir is full. In the excavation for the reservoir running sand (loose sand and water) was met with, and it was found necessary to put in a platform of timber under the concrete foundation, and reinforce the floor of the reservoir with "Kahn" trussed bars carried up a few feet in height round the walls. The total cost of the works, including the sum of 492*l.* 19s. 6d. for the borehole and adit, has amounted to 3,116*l.* 13s. 4d., only 35*l.* 4s. 4d. above the engineers' estimate of 3,081*l.* 9s. The contractor for the borehole and adit was Mr. A. H. J. Hole, of Sherborne, and the contractor for the reservoir and mains was Mr. J. H. Macdonald, of Southport. The work has been carried out from the plans and under the superintendence of Messrs. Beesley, Son, & Nichols, of Westminster, the engineers to the scheme.

Foreign.

PARIS.—Anxiety has been long felt about the danger to the Louvre from the system of warming from some fifty *calorifères* in the basement. The Secretary for Fine Arts has accordingly decided on removing all the apparatus for augmenting heat outside of the building, and placing it beneath the garden along the Rue de Rivoli. This arrangement will have the additional advantage of requiring the restoration of the *fosse* which formerly existed outside the building, whereby the fine sub-basement walls once visible, will be restored to view.——Considerable public feeling is being aroused against the multiplication of outdoor statues and monuments, which threaten to destroy the green effect of the gardens. It is complained that the Luxembourg garden is already little better than a necropolis, and two more to somewhat obscure persons are threatened in it.——The Salon intends to inaugurate this year a series of "Five' o'clock teas," to be accompanied or followed by lectures from eminent artists and literary men.——A Society which occupies itself with large musical performances has requested the use of the former theatre in the Palace at Versailles for some performances. The theatre became, after the war, the Salle des Séances of the Assemblée Nationale, and then that of the Senate; subsequently it has served only as the place of the election of the President. It is a beautiful theatre, built from the designs of Gabriel, and in spite of all the vicissitudes of the building it has preserved its architectural beauty and harmony; and might well serve as a model for imitation in buildings of this class. The consent to restore it to its ancient use is regarded as an interesting artistic revival.——The death is announced, at the age of 55, of the landscape-painter Paul Saïn, a pupil of Guilbert d'Anelle and of Gérôme. Though already ill, he had exhibited two pictures at the last Salon, where he had exhibited since 1879, and obtained medals in several years. Works by him are to be found in the museums of Clermont-Ferrand, St. Etienne, Perpignan, Perigueux, etc., as well as in his native town of Avignon.

GERMANY.—In the competition for new station buildings, Darmstadt, no first premium was awarded, but two premiums of 4,000 marks each were bestowed on Professor Pützer, of Darmstadt, and Professor Klingholz, of Aix-la-Chapelle.——The new police offices in Wilhelmshaven were built from designs prepared in the Public Works Department from sketches by Herr Launer. The style adopted is that prevalent in Lower Saxony, the materials used being brick and sandstone. The cost amounted to 104,900 marks, or 205 marks per square metre.——A Romanesque fresco has recently been laid bare in the ancient monastic church of Karthaus-Prükl, near Regensburg, now used as an asylum. It is in excellent preservation, and represents the Annunciation, the principal colours used being red and gold, while the aureoles of the Virgin and Angel were originally studded with stones.——There is hardly a town in Germany whose civil architecture is disappearing at such a rate as that of Old Hamburg. The heart of the town is daily taking on the stamp of the City of London, and Herr W. Melhop, of Hamburg, architect, is therefore to be congratulated on the treatise he has recently published on the "Civil Architecture of Old Hamburg." The 274 illustrations include fine half-timbered houses, richly-ornamented doorways and internal decorations, dating from the Middle Ages up to 1842, when the town was rebuilt after the fire.

AUSTRIA.—Amongst the papers which it is announced will be read at the eighth International Architectural Congress in Vienna, the following subjects promise to be of peculiar interest:—The Influence on Architecture of the Modern Tendency of Art; The Influence of Historical Styles on the Development of New Forms of Building; A Comparison of the Building Acts of Berlin, London, Paris, Rome, and Vienna, and their Influence on the Architecture of these Cities; On Measuring up Architectural Monuments; On the Copyright of Architects' Ideas; The Planning of Mediæval German Cities and its Bearing on the Present. The following subjects will also be discussed:—1, The Fostering of Art by the State; in connexion with which subject the following resolution to be considered: The State authorities are urgently called upon to appoint ministers for arts and crafts, these ministers to be selected from among prominent artists. Architects to be in the predominance considering the fact that architecture is the leader of plastic arts, the work of these ministers would be to foster and further plastic art in all its provinces. The Committee (No. 9, Eschenbachgasse, Vienna) begs that written opinions on this resolution be sent in to it not later than March 15. 2, Legislation on the Copyright of Artistic Property in Works of Architecture; 3, The Decision of International Competitions; 4, Awarding of Government Diplomas to Architects; 5, Preservation of Public Monuments; 6, On Ferro-concrete Construction.——On the 3rd ult., at the age of 97, died Ferdinand Wagner Ritter v. Wagensburg, the Nestor of the Austrian railway system. He received the Order of Franz-Joseph for his excellent work on the Laibach-Trieste line, the Order of the Iron Crown for his zealous activity in arranging for the transport of troops in 1859, and the Cross of the Order of Leopold for the conspicuous part he played in the Peace Conference held at Prague in 1866. In 1870 he received the Order of the Red Eagle for his share in furthering the working agreement of the Austro-Prussian railway system.

ITALY.—Reporting on the trade and commerce of South Italy for the year 1907, Mr. Eustace Neville-Rolfe, British Consul-General, states that building has been going forward at a great rate throughout the past twelve months. The whole of the ground reclaimed from the sea at Santa Lucia, with the exception of one small part, has been taken up, and several houses are in an advanced stage upon it. The same may be said of the building land in the Parco Margherita at the west end of the town. Many new houses have also been built in the suburb of Posilipo. The "free zone" at the east end of the city is rapidly being covered with large

factories, and the ground near the port, which a few years ago was laid out as a garden for the use of the people down by the docks, has all been absorbed for warehouses, electric station, and other commercial purposes. This industrial activity has already had the effect of raising the price of labour, and causing able-bodied men from the country to flock into the town, to the great inconvenience of neighbouring agriculturists. Enormous improvements have been undertaken in the port of Naples, most of which are complete, and the rest may be expected to be finished in the course of the next few months. The dry dock, one side of which fell in some two years ago, has been rebuilt, a large trapezoidal mole has been constructed for the landing of passengers, important dredging works have been completed, and the large breakwater, which is to protect the harbour and the new docks to the eastward, will be finished within the stipulated time of six years, and is large enough already to give a good deal of protection. Attention will then be turned to the buildings on shore. The custom-house and the offices of the captain of the port are to be increased by buildings estimated to cost 40,000*l.* The Sacramento quay, which is inconveniently small, will have a large addition made to it.

SWITZERLAND.—One hundred and nine designs were entered for the competition for a bank and offices to be built in Sarnen. The three premiums were awarded to Messrs. Welti-Herzog & Son; to Herr Johann Metzger, of Zurich; and to Messrs. Schneider & Sidler, of Baden.—On February 7 died Jost Wey, chief engineer of the St. Gall Rhine Regulating Works. He studied in Lucern, Paris, and Vienna, and from 1874 onwards was chiefly engaged on the regulation of the Rhine in St. Gall, and the irrigation of that canton. His special knowledge on water engineering was so great that his advice as an expert was much sought after both in his native land and out of it.—Out of thirty-four competitors who submitted designs for the University Buildings, Zurich, the first premium of 8,000 francs was awarded to Messrs. Curjel & Moser, of Carlsruhe.—The new Evangelical School in Gossau, recently opened, was built for a sum of 155,000 francs from the design of Herr A. Gaudy, of Rorschach.

Miscellaneous.

PROFESSIONAL AND BUSINESS ANNOUNCEMENT.—Mr. Alfred E. Nightingale is carrying on his practice as architect and surveyor at 98, High-street, Putney, S.W., as previously to the death of his father, and has retired from the partnership with his brothers, carrying on business as B. E. Nightingale, London.

SHEFFIELD SOCIETY OF ENGINEERS AND METALLURGISTS.—At a recent meeting of the Sheffield Society of Engineers and Metallurgists, Mr. Cosmo Johns gave a lecture on "Refractory Materials—a *résumé* of recent progress in the study of the silicon compounds with reference to the properties of the acidic refractory materials." Mr. Johns briefly described the new products of the electric furnace, carborundum, and siloxicon, and their value as refractories, and gave some details of their manufacture. He then introduced the members to the methods of physical chemistry in dealing with the many problems presented by the ordinary fire-brick and its more aristocratic relative, the Dinas or silica brick. It was explained how the older methods of research, such as a chemical analysis of the various clays or raw material, and an occasional trial to determine the resistance to high temperatures, had failed to throw any light upon the laws that govern the action of the various substances found in the raw material used by makers of fire-resisting materials. It was significant that in other branches of pure and applied science there was the same hopeless feeling that facts were being accumulated faster than they could be tabulated, while at the same time no further light was being thrown on the fundamental principles that were hidden behind all those facts. The forest could not be seen because of the trees. The lecturer went on to review the chief substances in fireclays, gannister, and the silica brick, and dealt with them first singly and then in pairs. Silica, as the predominant compound, was described in its many forms. It was a curious fact that it changes its mineral form and acquires new properties, among which a much higher melting-point is the most important. The bearing of this on the mode of manufacture of the silica brick was pointed out. Silica in its many forms would seem to be nearly as complex as steel. The fusion-point of mixtures in various proportions of silica and alumina was described, with the aid of the fusion-point curve, from which it could be seen that in certain proportions these substances, highly infusible when single, were much more easily fused. Silica and lime were the next pair to be dealt with, and here the recent researches of Dr. Day and his assistants in the geophysical laboratory at Washington were drawn upon to throw some light on the behaviour of the silica brick when used in steel-making furnaces. Then the curious behaviour of the oxides of iron at high temperatures came under notice, and the absorption of oxide of iron by the silica at steel-melting temperature was commented upon. Proceeding to discuss fire-bricks themselves, the lecturer showed that the size of the particles, nature of the bonding material, and temperature of burning were intimately related to the many theoretical matters already referred to. He showed specimens of quartz sand, and various crystals, before and after burning. The presence of large quantities of magnetic oxide of iron in used silica bricks was demonstrated.

ST. MARY'S CHURCH, TOTNES.—A tablet bearing the names of the vicars of this church extending back to 1260 has been placed in the south aisle. It was designed by Mr. Charles R. Baker King, architect, and has been executed by Messrs. Harry Hems & Sons, ecclesiastical sculptors, of Exeter.

SUGGESTED WIDENING OF LIVERPOOL-ROAD.—The improvements Committee of the London County Council have drawn the attention of the Borough Council of Islington to the fact that a favourable opportunity for widening Liverpool-road occurs owing to the leases of Nos. 3 to 11 being about to expire, and asks if the Borough Council will agree to contribute a third of the cost. It appears, however, that the property in question is outside the Borough of Islington.

SEWER WORKS IN LAMBETH.—At the sitting of the Lambeth Borough Council on Thursday last week, the Public Health Committee submitted estimates for sewer works in proposed reconstruction and new sewers. These included reconstructions, new sewers, etc., for the prevention of flooding, 2,328*l.* 2s. 4d.; sewer work *re* Highways Committee, 464*l.* 3s. 6d.; gulley work, 945*l.* 5s.; general maintenance, 4,000*l.*; maintenance of gullies, 300*l.*; combined drainage, 1,200*l.*; total, 9,240*l.* 10s. 10d.—After discussion the estimates were approved.

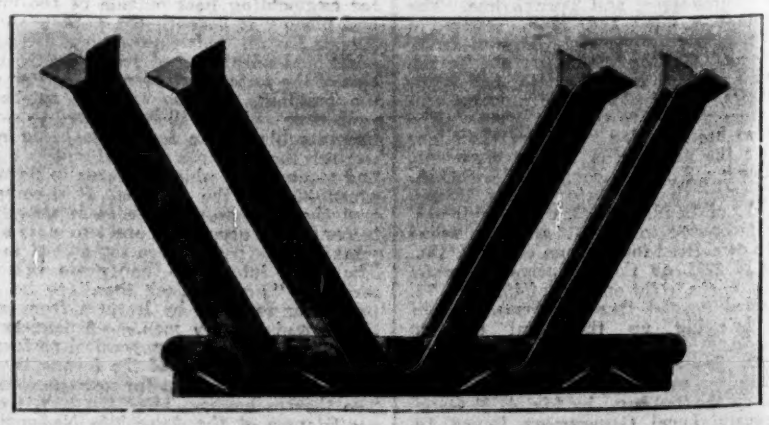
PAVING WORKS IN LAMBETH.—The Lambeth Borough Council on Thursday last week had before it the estimates for new paving works to be undertaken during the coming financial year, the total of which amounted to 21,627*l.* 1s. The most important of the contemplated works are the repaving of the carriage-way in Wandsworth-road with granite pitching at a cost of 2,229*l.*; repairs to York stone footways in Milkwood-road, at a cost of 1,601*l.*; repaving the carriage-way in Norwood-road with deal blocks, 4,606*l.*; repaving carriage-way in Kennington-road with wood blocks, 3,311*l.*; and paving carriage-way in Knollys-road, 1,633*l.* The estimates were approved.

A NEW BAR FOR REINFORCED CONCRETE.—The "Perfector" bar, patented by Mr. W. H. Brown, of York, and supplied by the Perfector Bar Company, of Westminster, consists of a rolled-steel bar something like a bulb tee without the flange. The flat web is slotted at intervals of a few inches apart for the insertion of stirrups, made of steel strips for withstanding shear and tension on diagonal planes in the concrete which it is intended to reinforce, the main bar being applied as tension and compression reinforcement. The slots are arranged either horizontally or at an angle of 45 deg., as may be preferred, and they can be spaced at any predetermined distance apart. The main object is evidently to provide a mechanical bond between the two classes of reinforcement, in such a way as to obviate any risk of displacement by careless workmen, and at the same time to permit latitude on the part of the designer in respect of spacing the shear reinforcement. It is claimed that the bar can be used with equal facility in the reinforcement of beams, columns, piles, walls, chimneys, and pipes. The idea is ingenious, and the bar quite complies with theoretical and practical requirements.

THE LONDON COUNTY HALL SITE.—Further progress was made last week with the arbitration which is proceeding at Westminster, before Mr. Samuel Walker, with respect to the compensation to be paid to Messrs. Holloway Brothers, London, Ltd., by the London County Council for the firm's riverside works adjacent to Westminster Bridge, required as part of the site of the proposed County Hall for London. Mr. Edward Morten and Mr. Hugh Sturges are counsel for the claimants; Sir Edward Boyle, K.C., and Mr. H. Courthope-Munroe for the County Council. Mr. George William Humphreys (works manager to the London County Council) gave evidence in great detail as to the quantity and prices of materials handled at the wharf in question. Mr. Morten said it would be idle to cross-examine upon some of it, seeing the very limited bearing it had, in his view, upon the case. Mr. B. T'Anson Breach, F.S.I., member of the Council of the Auctioneers' Institute, described the property, and stated that the agreed area of the wharf was 53,388 ft. The value of a wharf per foot super diminished as the depth increased, and this was almost unnecessarily deep, averaging 355 ft. He based his valuation of this property upon his many and extensive transactions in riverside premises during the last thirty years, and he treated it as bare land, because the cost of the buildings was to be ascertained and added afterwards. In his opinion, the outside value per foot per annum of this piece of land was 8d., or 1,780*l.* a year, from which he deducted the rent reserved in the lease, 1,430*l.*, leaving a profit rental of 350*l.* per annum. That he took on the 5 per cent. table for 71½ years, 19·4 years' purchase, 6,790*l.* To that he added the usual 10 per cent. for forced sale, making 7,469*l.* as the value of the land to the claimants. It was not worth that in the market. He added for the buildings on the site 25,830*l.* He adopted Mr. Andrew Young's figure of 20,000*l.* for disturbance, though he thought it too much. Inclusive of various minor items, his total valuation amounted to 59,321*l.* Mr. Daniel Watney, Past-President of the Surveyors' Institution, who said that he had had forty-nine years' experience on his own account, gave a valuation of land and buildings, 32,144*l.*; disturbance, 20,000*l.*; and, with other sums, it amounted to just over 55,000*l.*, sundry agreed items being also taken into account. The case has been adjourned *sine die*.—*Times*.

PAVING IN CHELSEA.—At the sitting of the Chelsea Borough Council, it was decided to pave the portion of Beaufort-street between Keys-road and Cheyne-walk with creosoted wood blocks at an approximate cost of 2,730*l.*, and to pave a portion of Pavilion-road in a similar manner at a cost of 300*l.*

WORKING-CLASS DWELLINGS IN CHELSEA.—The Chelsea Borough Council have had under consideration a letter from Messrs. Lamb, Son, & Prance, on behalf of the Sutton Estate, stating that the Sutton Trustees have agreed to purchase, subject to the approval of the Court, land in the vicinity of Marlborough-square, for the erection of working-class dwellings: pointing out that the contract for the purchase of the site is conditional, not only on the approval of the Court, but also to the necessary order being obtained for the closing of Eborall-place, Pym-street (late Little College-street) and Marlborough-square, and to the opening of a new street leading from Marlborough-street to Leader-street; asking



The "Perfector" Bar.

whether the Committee are favourable to the suggested closing of the streets mentioned, and, if so, whether they will authorise an affidavit to be made to this effect, which can be used on the application to the Court.—It was agreed to inform the writers that the Council will favourably consider the proposal.

LAMBETH COUNCIL.—The Mayor announced at the meeting of the Lambeth Borough Council on Thursday last week that the Prince and Princess of Wales had promised to open the new town hall at Brixton on Wednesday, April 29.—The seal of the Council was put to an agreement by which the South London Electric Light Corporation is to light the new town hall free of charge. This is the result of a settlement of a long-standing dispute in connexion with the burning of the refuse in a destructor at the electric light works.—The tender of Messrs. Lapthorne of 1,443*l.* was accepted for improvements at the Lambeth mortuary.

FAIR WAGES AND THE LONDON COUNTY COUNCIL.—The following resolution was presented to the Stores Committee of the London County Council on the 10th inst.:—"That this conference of delegates, representing 20,000 members of the Amalgamated Society of Carpenters and Joiners, General Union of Carpenters and Joiners, United French Polishers' Society, National Amalgamated Furnishing Trades' Association, General Amalgamated Labourers' Union, United Builders' Labourers' Union, emphatically protest against the action of the Stores Committee in recently discharging a number of workers from the Furniture Stores, Clerkenwell-close, while at the same time they are sending out work to contractors, many of whom are carrying out the work under conditions which are not in conformity with the Fair Wages' Clause of the Council, and is in direct opposition to the pledges made to the electors at the last elections, and in contravention to their definite pledge to the deputation that waited upon them on this question, May 7, 1907, which was to the effect that no discharges should take place until a full inquiry into the whole circumstances of the management of the said works had been made."

HOUSING AND TOWN PLANNING BILL.—In Tuesday's Parliamentary papers, Mr. Sheehan asks if the Irish Government are prepared to recommend that the provisions of the Bill for the better housing of the working classes which is to be introduced by Mr. Burns shall apply to Ireland.—Mr. Birrell replies that the Irish Government are not prepared to recommend the extension of the Housing and Town Planning Bill to Ireland. The provisions of the Bill, while no doubt suitable to English centres of population, would not meet the difficulties which present themselves in dealing with the housing problem in Ireland.

NEW FOLDING HOUSE STEPS.—Heathman's lattice steps, which have been well known for many years, had the disadvantage of being 6 in. thick when closed, and we are now informed that an improvement has been effected to enable them to fold up so that the closed thickness is now only 2¾ in. They are also made without the supporting legs, to close to only 1½ in. thick, and open to 6 in. width of tread.

THE LAW OF CONTRACTS.—A lecture on "The Principles of the Law of Contract" was delivered before the Faculty of Accountants, at 56, Moorgate-street, on the 4th inst., by Mr. Clement Gatley, Barrister-at-Law. He commenced by emphasising the importance of an acquaintance with the principles of the law relating to contracts, not only to the practising lawyer, but also to all whose business or profession involved them in the handling of legal documents, or the entering into of contractual relations. After expressing himself to be completely in agreement with the objects and aims of the Faculty, the lecturer proceeded to enumerate and illustrate many instances of agreements which were not contracts in the real legal sense of the term, and those that the State (whose paramount policy it is not to interfere with the freedom and enforceability of contract) would not enforce owing to their being against public policy. Proceeding to analyse his definition, Dr. Gatley dealt with the principle of offer, and showed how an offer might lapse or be revoked before and without being turned into a contract by acceptance. After dealing with the law as regards acceptance of an offer, the lecturer referred to those additional formalities that the law requires before it will recognise the agreement as a binding contract; and gave examples of contracts *primâ facie* good and binding that might be void or voidable owing to the absence in fact of a real *consensus ad idem* or mutuality of intention at the time the contract was entered into, through mistake, misrepresentation, or the case where one party has exercised undue influence or duress but for which the contract would not have been entered into.

BUILDINGS AND DRAINS IN WEST HAM.—The Works Committee of West Ham Corporation has had under consideration the desirability of adopting some of the sections of the Public Health Acts Amendment Act, 1907, and has decided in favour of application being made to the Local Government Board for an order authorising the adoption of the following sections:—The local authority may retain any drawings, plans, elevations, sections, specifications, and written particulars, descriptions, or details deposited with and approved by them in pursuance of any enactment for the time being in force in the district or of any by-law thereunder; the local authority may require the corner of any building intended to be erected at the corner of two streets to be rounded off or splayed off to the height of the first story, or to the full height of the building, and to such extent otherwise as they may determine, and for any loss which may be sustained through the exercise of the powers by this section conferred upon the local authority, they shall pay compensation. The Public Health Committee favour the adoption of the section making it a regulation that before any drain existing and not communicating with any sewer of the local authority shall be made to communicate, the local authority may require the same to be laid open for examination by the surveyor, and no such communication shall be made until the surveyor certifies that such drain may be properly made to so communicate.

MANCHESTER BUILDING TRADES' EXHIBITION.—Messrs. Johnson, Clapham, & Morris point out that in noticing their brick reinforcement system we should have said a "1½-in." cavity not a 2-in., which would not work into the measurements of thickness. Messrs. McNeill & Son maintain that we were mistaken in our conclusion that their three-ply combination roofing requires more labour in laying than some of the simpler forms of asphalt roofing. They may be right in actual working; that was the impression, however, produced by an examination of the exhibit. There were other exhibits we should have been glad to mention had time permitted a longer visit. We may add here, however, a word as to the Saxon Portland Cement Company's, who showed a sample of their cement described as a finely-ground powder, consisting of about 60 per cent. of absolute "flour," and leaving only 1 per cent. on a sieve with 5,800 holes per square inch. As the makers say, fineness of grinding is very important; the finer a cement is ground, the greater is its cementitious value. The makers claim that the expansion of the Saxon cement under the Chatelier test is only 1·5 millimetres, as compared with the 6 millimetres allowed in the British Standard Specification.

THE RETIREMENT OF EDINBURGH CITY ARCHITECT.—As a result of the superannuation scheme affecting the officials of the Edinburgh Corporation, Mr. Morham, the City Superintendent of Works, will retire in May.

PRESERVATION OF ANCIENT MONUMENTS.—Mr. Llewelyn Williams inquires in the Parliamentary papers whether it is the intention of the Government to take steps to preserve the ancient monuments specified by the Royal Commission appointed to make an inventory of the ancient and historical monuments and constructions of Scotland, and, further, whether he is prepared to recommend the appointment of a similar Commission for the discovery and preservation of ancient and historical monuments in Wales.—Sir H. Campbell Bannerman states, in reply, that the Government must wait for the Report of the Royal Commission before coming to a decision as to the preservation of such monuments. With regard to Wales, a country rich in monuments, he could make no announcement at the moment, but will be prepared to consider any representations which may be made to him on the matter.

IRISH MATERIALS FOR IRISH BUILDINGS.—Answering a question by Mr. Field as to the boycott of Irish materials by the Board of Works in Ireland, and as to why a copy of the specifications for buildings cannot be furnished to a member of the House, Mr. Runciman, in Wednesday's Parliamentary papers, says he can assure the hon. member that no boycott of Irish materials by the Board of Works has taken place in connexion with the College of Science or any other building works in their charge, as Irish materials are being employed wherever their use is compatible with efficiency, suitability, and economy. In the case of the College of Science, about 86 per cent. of the building material to be used is Irish. Specifications for buildings are only prepared with the object of enabling firms to tender for the works, and for the use of the contractors by whom the works are carried out. The only copy of the specification issued is that given to the contractor for the building, and it would not be in the interests of the successful carrying out of contracts that any other copies should be distributed.

PLANS FOR PROPOSED LAMBETH WORKHOUSE.—At the meeting of the Lambeth Guardians on Wednesday, the Works Committee reported as follows with reference to a letter from Mr. S. R. J. Smith, architect, stating that he was giving up his business, which would be carried on by his chief assistant, Mr. H. G. McLachlan, who would undertake any work with the Guardians on the terms already made with him:—"We have considered the scale of payment adopted by the Guardians in 1903 as to the remuneration to be paid to Mr. Smith in respect to the alterations and additions proposed to be made at the Princes-road Workhouse, and we recommend that in the agreement proposed to be entered into between the Guardians and Mr. Smith and Mr. McLachlan, a clause be inserted to the following effect: That in the event of the plans already submitted, or any other plans or scheme prepared by Mr. Smith or Mr. McLachlan, for alterations and additions to the workhouse being adopted by the Board, the payment in respect of such plans or scheme, and of the superintendence of the execution thereof, to be at the rate of 3½ per cent. of the future expenditure on the old or the substituted scheme, but it is to be distinctly understood that the Guardians do not bind themselves to adopt the plans prepared by Mr. Smith, or to retain the services of Mr. McLachlan to prepare other plans."—Mr. Gough-Cook urged that if the Guardians really did intend to enlarge the workhouse, and for which purpose they had paid Mr. Smith 934*l.* for the preparation of plans, there should now be open competition. As to the scheme which Mr. Smith had drawn up, it should be remembered that that was only for the accommodation of 300 inmates, whereas now they might want accommodation for 600 or 700. If the Guardians really intended to build, they should have competitive plans, for those prepared years ago, he feared, would not be of very much use. Moreover, it would not be fair to Mr. McLachlan that he should prepare a new scheme and have, as was suggested, to take 934*l.* less than the usual charge because of the payment that had been made to Mr. Smith.—Mr. Collins, Chairman, said the object was that the Guardians could get something for the money they had paid to Mr. Smith. The Board, of course, did not bind itself to accept Mr. McLachlan's scheme, though the fact that they were to get his plans for 1¼ per cent. less than anyone else would expect might keep other architects from competing. There was also the question that some might compete by underestimating in order to get their plans adopted. He agreed that the Guardians ought not to prejudice the scheme for the money they had wasted in the past.—The Board decided to take no action in the matter for six months.

LIBRARY, FULHAM.—The Fulham Borough Council have approved of the sketch plans of the new central library, comprising (1) the basement, (2) the ground floor, (3) first floor, and (4) the drawing of the front elevation of the building as submitted by Mr. H. T. Hare, F.R.I.B.A., the architect.

DISTRICT SURVEYORS' FEES.—At Wednesday's meeting of the London Education Committee, it was reported that Mr. E. D. Drury had claimed 22*l.* 13*s.* 1*d.* for fees in respect of his services in connexion with the erection of the Westminster Technical Institute; but in view of the fact that the question of whether the District Surveyors have any jurisdiction over the Council's school buildings may shortly be the subject of legal proceedings, he had allowed the account to stand over pending the conclusion of such proceedings.—The District Surveyor for Islington has asked that notice be given to him before service and other boxes are placed in the public way, and claiming fees in respect thereof. At the sitting of the Islington Borough Council, it was reported that, until a recent decision of the Divisional Court in the case of Perkins *v.* the County of London Electric Supply Company, it was never contemplated that the provisions of sect. 145 of the London Building Act applied to the small boxes placed in the public way by the Council under the powers conferred upon them by their Electric Lighting Order. The District Surveyor will now be enabled to claim a considerable annual sum by way of fees in respect of such boxes, notwithstanding that plans thereof have to be submitted to and approved by the Borough Engineer, who is directly responsible for the safety of the public way, and that no useful purpose can possibly be served by the further examination of such boxes by the District Surveyor. It was resolved to ask the London County Council to insert clauses in their next General Powers Bill to remove from the operation of the London Building Act works placed in the public way by metropolitan electric lighting authorities under statutory powers, and that

other authorities be requested to take similar action.

SANITARY ARRANGEMENTS AT SCHOOL BUILDINGS.—The Public Health Committee of the Islington Borough Council have been in communication with the Education Committee of the London County Council with reference to the sanitary arrangements at the Hanover-street school, the Borough Council having expressed the opinion that modern water-closets should be substituted for the trough water-closets, as the latter, in their opinion, constitute a nuisance injurious and dangerous to the health of the pupils. The Education Committee, however, do not consider that they would be justified in substituting modern appliances, and they refer to the memorandum issued by the Local Government Board, dated December, 1907, on the arrangements for drainage and the disposal of waste matters at public elementary schools. Notwithstanding this, the Public Health Committee were still of opinion that the retention of trough water-closets at public elementary schools was undesirable, and it was agreed to call the attention of the Local Government Board to the desirability of all reference to latrines (trough water-closets) being eliminated from the memorandum issued by the Board.

Law Reports.

DAMAGE TO PROPERTY BY MINING OPERATIONS.

IN the Chancery Division on the 11th inst., Mr. Justice Swinfen Eady delivered a considered judgment in the case of Markham *v.* Paget—an action by the plaintiff, Mr. Arthur Basil Markham, M.P., against the defendant, Mrs. Helen Elizabeth Paget, of Percival-terrace, Brighton, for damages and expenses incurred through the subsidence of Stuffnywood Hall, Derby, by the mining operations of her lessees, the Shirebrook Colliery Company, who were made third parties to the action.

It appeared that Mrs. Paget was the tenant for life of the mansion-house which the plaintiff rented for two years at 317*l.* a year. He had also to maintain the vineries and other glasshouses, which were very extensive. In 1905 symptoms of subsidence appeared and rapidly increased, until the mansion became uninhabitable. The pipes of the hothouses broke so that many valuable plants and a quantity of grapes and other fruits and vegetables grown under glass were destroyed by frost; the water supply was seriously affected, and a large tank kept for use in case of fire ceased to hold water; the ceiling of the mansion cracked, and the chimneys showed signs of falling. The drainage became so disorganised that Mrs. Markham and the children got sore throats, and a friend staying at the hall had blood poisoning. Plaintiff's family had to be removed, and eventually the plaintiff was compelled to leave and to store his furniture, although plaintiff continued to pay the rent and otherwise fulfil his contract until July 31, 1907.

Mr. Justice Swinfen Eady held that Mr. Markham was entitled to recover from Mrs. Paget on the footing that the agreement of tenancy contained an implied covenant of "quiet and comfortable enjoyment," and his Lordship assessed the damages at 700*l.*, and judgment was entered accordingly, with costs.

The claim by the defendant to be indemnified by the Colliery Company was dismissed, with costs.

Leave to appeal was given on condition that the defendant paid the 700*l.* into Court, and paid the taxed costs on the usual undertaking to return if the appeal proved successful.

BRIGHTON NUISANCE CASE JUDGMENT.

MR. JUSTICE JOYCE, in the Chancery Division on the 7th inst., delivered a considered judgment in the case of Heath and others *v.* the Brighton Corporation—an action by the plaintiffs, the incumbent and the trustees of the Church of St. Mary and Mary Magdalene, Brighton, for an injunction to restrain the defendants from so using the machinery for the purpose of generating electricity as to cause a nuisance and annoyance to the plaintiffs. (The case was reported in the *Builder* of February 8 last.)

It appeared that the church was erected in the year 1862, and was duly licenced for the performance of divine service by the minister of the district according to the rights and usages of the Church of England. Buildings used in connexion with Sunday-schools, classes, and a working-men's club were annexed to the church, which was capable of holding about 300 people. In 1891 the defendants under their Electric Lighting Order, 1883, erected in close proximity to the church a quantity of machinery for the purpose of generating electricity, and in 1905, for the purposes of their tramway and electric lighting system, erected a new generating-station at Southwick, and connected it with their existing works, which were then extended for the purposes of transforming and transmitting currents of electricity. The plaintiffs' case was that in consequence of this extension of the works the defendants had since March, 1906, caused, and were still causing, a nuisance to the plaintiffs by noise. It was said that the congregation were inconvenienced and disturbed in the church, and that great annoyance was caused in the adjoining buildings, where classes and meetings were held. The defendants denied that they were causing a nuisance to the plaintiffs. They further said that the machinery they used was of the best and most smoothly-working modern type, and was properly housed in a building specially designed and suitable for the purpose, and that in most parts of the church it was impossible to hear any sound at all from the works, and in other parts of the church and classrooms any sound from the works amounted at most to a faint hum or buzz which could only be detected in the absence of all other noise, and did not at any time amount to a nuisance. Defendants also by way of defence relied upon their statutory powers, and also on the fact that they as a public authority were exercising such powers in relation to the public supply of electricity in a reasonable and proper manner, and according to the best and most approved methods.

Mr. Justice Joyce, in giving judgment, after stating the facts, said there was no complaint of actual vibration, but it was alleged that the incumbent and persons attending the church or holding classes or meetings in adjoining rooms were disturbed by the regular sound of the working of the transformers at the North-road works. He had come to the conclusion that it was better for him not to visit the works, but he had called in a gentleman, named Sparks, as a competent adviser to report to the Court. This had been done, and it was impossible not to attach very great weight to the report. The action had been brought to trial, and there had been a great deal of evidence which was conflicting, not so much on actual matters of fact, as to points on which opinions might not unnaturally differ. There was no question of pecuniary damage, and it was not alleged that the congregation had diminished; only one of the plaintiffs—the incumbent—was personally annoyed, and he was not prevented from preaching and conducting the service. But the plaintiffs were not, because their premises were used as a place of worship, entitled to anything more than the ordinary amount of quiet in a town. They had no special rights because of the purposes for which the church was used. As to what amount of noise or annoyance from noise would be sufficient to sustain an action, there was no definite legal rule or measure. It was a question of fact in each case. In the present case the locality was that of a large town, the neighbourhood being poor, and certainly not within that which could be described as a residential part of Brighton. There were other works in the neighbourhood, and the population were composed mostly of workpeople and small shopkeepers. A nuisance of that kind could not be excused merely on the ground that the works were in a suitable place; but, in considering whether the comfort of the plaintiffs was materially interfered with regard must be had to the character of the neighbourhood and the surrounding circumstances. Upon the evidence, his Lordship thought that the sound complained of could not be heard during any singing or playing of the organ, or when there was any other sound in the church. In certain parts of the church it could not be detected by listening even when there was otherwise perfect silence, and sometimes it could not be heard at all anywhere in the building. He thought that people might attend the services and never detect any sound at all. He thought that the sound might at times cause annoyance or irritation to certain sensitive persons; but it ought not to distract the attention of ordinary healthy persons. The law did not regard trifling inconveniences, and things of that sort must be looked at from a reasonable point of view. There might be considerable annoyance and yet not a legal nuisance sufficient to support an action. It was obvious that the granting of an injunction would be a serious matter in the case. He thought on the whole that the plaintiffs had not established their right to relief. He was of opinion that the action failed, and must be dismissed. If the case went no further, he suggested that the defendants might very well not insist upon costs.

Mr. Astbury, K.C., on behalf of the Corporation, said that his clients would consider what his Lordship had said with regard to costs.

Patents of the Week.

APPLICATIONS PUBLISHED.*

3,226 of 1907.—A. B. HOLMES: *Electric Heating Apparatus.*

This relates chiefly to electric heaters of the radiating-lamp type, that is, electric heating apparatus wherein a lamp or lamps of the incandescent type is or are used primarily as heaters through the radiation of heat from their incandescent filaments, and such lamps are disposed within a tube or case open below and above, with an annular space between the lamp glass and the tube or case through which an upward flow of air can take place, which, during this passage, is heated by the radiating heat of the lamp, and is discharged from the upper open end into the room or space to be warmed, and consists in a heating apparatus of the kind described or referred to being provided or constructed with a double air way or space open below and above through which the air can pass upwards from the apparatus, and be heated and discharged into a room or space to be heated.

3,305 of 1907.—W. REUTER: *Electrical Brakes for Hoisting Apparatus, Cranes, and the like.*

This relates to a method of connecting so-called Foucault current brakes for the lifting mechanism of cranes and other hoisting appliances, characterised by the fact that during the lowering movement, in order to prevent the motor from getting out of control, a Foucault current brake connected in shunt with the motor is energised either before or simultaneously with the motor when the lowering movement starts.

3,344 of 1907.—O. WILHELMI and W. OVERLIES: *Method of and Device for Making Seamless and Jointless Channels in Blocks of any kind of Concrete, Mortar, Clay, or the like Ceramic Material.*

This relates to a method of and device for making seamless and jointless channels in blocks of any kind of concrete, mortar, clay, or the like ceramic material with the aid of a core consisting of a helically-wound coil, characterised in that as the material for the coil, wire is employed, which after use can be easily unwound or removed from the finished channel, the latter action being done in such a way that during the same the wire is again wound on a bobbin of corresponding thickness to the area of the channel again to be formed with this fresh coil.

3,515 of 1907.—C. WEBER: *Machine for Moulding Artificial Stone Blocks.*

This relates to a hand-moulding machine for the simultaneous production of a number of blocks in which half of the moulding-box is capable of being swung over on pivots, characterised by the feature that the rear wall of the mould and the bottom plate firmly connected to it can be swung out of the moulding-frame together with the finished blocks, and that on moving back these parts of the mould after the removal of the finished blocks, the intermediate walls will pass through slots in the bottom plate and the revoluble back plate becomes the longitudinal wall of the mould.

3,916 of 1907.—C. E. WOODARD and J. A. THOMLINSON: *Light Fireproof and Sound-resisting Building Composition for the Construction of Walls, Ceilings, and other like purposes.*

This relates to a light fireproof and sound-resisting building composition for the construction of walls, ceilings, and other like purposes, comprising globules of slag (preferably basic slag), formed by dropping molten slag into water, combined with some binding material of a fireproof nature, preferably of a gypseous character. The material can either be cast or rendered to a smooth surface, or the globules may be left projecting on the face.

10,022 of 1907.—W. A. HILDYARD: *Door and the like Bolts.*

This relates to a door and the like bolt made of angular cross-section with a cylindrical rear extension, a draw-handle rotatably mounted on said extension, and a spring washer or coiled spring also mounted on said extension and bearing against the draw-handle.

10,540 of 1907.—J. W. CRAVEN: *Machines for Making Bricks, Tiles, and the like.*

This relates to machines of the rotary mould-table type for making bricks, tiles, and the like, in which the pistons are pressed down in the moulds by the material being moulded, and consists in the shank or rod of the piston resting on a counter-weighted lever turning on a

* All these applications are in the stage in which opposition to the grant of patents upon them can be made.

PATENTS.—*Continued on page 321.*

List of Competitions, Contracts, etc.

For some Contracts still open, but not included in this List, see previous issues. Those with an asterisk (*) are advertised in this Number: Competitions, iv.; Contracts, iv. vi. viii. x.; Public Appointments, xviii.; Auction Sales, xxviii.

Certain conditions, beyond those given in the following information, are imposed in some cases, such as: the advertisers do not bind themselves to accept the lowest or any tender; that a fair wages clause shall be observed; that no allowance will be made for tenders; and that deposits are returned on receipt of a bonâ-fide tender unless stated to the contrary.

The date given at the commencement of each paragraph is the latest date when the tender, or the names of those willing to submit tenders, may be sent in.

***** It must be understood that the following paragraphs are printed as news, and not as advertisements: and that while every endeavour is made to ensure accuracy, we cannot be responsible for errors that *may* occur.**

Competitions.

MAY 15.—**Tuam.**—SEWERAGE WORKS.—Tuam R.D.C. offer a prize of 50*l.* for the best set of plans, with estimate, for the sewerage of the town of Tuam. Plans and estimates to be sent to the Clerk of the D.C. on or before May 15. Mr. J. P. McDonogh, Clerk to Council.

* NO DATE.—**Gosport.**—NEW SCHOOL.—The Gosport and Alverstoke Education Committee invite architects to submit competitive plans for proposed new school. Names to be sent in not later than March 23. For further particulars see advertisement in this issue.

Contracts.

BUILDING.

MARCH 16.—**Aston Manor.**—EXTENSION OF POWER STATION.—The Corporation invite tenders for the extension of the power station at Chester-street. Plans, etc., may be seen, and bills of quantities obtained (on payment of 1*l.* 1s.), from the Borough Surveyor's office.

MARCH 16.—**Guisborough.**—HOUSES.—Full and separate tenders for sixteen houses, at Guisborough, for the Guisborough Co-operative Society, Ltd. Plans, etc., to be seen at office of Mr. Walter G. Roberts, architect, 61, Albert-road, Middlesbrough.

MARCH 16.—**Princetown.**—COTTAGES.—Great Western Railway Directors invite tenders for the erection of four cottages at Princetown Station, Devon. Plans, etc., may be seen, and forms of tender obtained, at the office of the engineer at Plymouth North-road Station.

MARCH 16.—**Rochford.**—ALTERATION OF BOARD-ROOM.—Alteration of the Board-room at Rochford Workhouse. Plan, etc., may be seen at office of Mr. Frederic Gregson, Clerk, 46, Alexandra-street, Southend-on-Sea.

MARCH 16.—**Southend-on-Sea.**—EXTENSION AT THE SANATORIUM.—The Corporation invite tenders for alterations and additions to the laundry, mortuary, and ambulance house at the Sanatorium, Balmoral-road. Plans, etc., may be seen, and bills of quantities and forms of tender obtained (on deposit of a cheque for 1*l.* 1s.), upon application to Mr. Ernest J. Elford, C.E., Borough Engineer, Southend-on-Sea.

MARCH 16.—**Stockport.**—SCHOOL.—The Education Committee invite tenders for Municipal Secondary School for girls, Greek-street. Messrs. Cheers & Smith, of Blackburn and London, are the architects. Names to Mr. Arthur Lawton, Secretary to Education Committee, together with a deposit of 3*l.* 3s.

MARCH 16.—**Torquay.**—VESTRY.—The erection of a new clergy vestry at S. Luke's Church, Torquay, for the Vicar and Churchwardens. Drawings, etc., may be inspected at the offices of Messrs. E. Appleton & Son, architects, Torquay.

MARCH 17.—**Barrow-in-Furness.**—RETORT HOUSE.—The Corporation invite tenders for the taking down and rebuilding of the gable end of the retort house at the Gasworks. Particulars may be obtained at the Gasworks.

MARCH 17.—**Ossett.**—FARMHOUSE.—The erection of a farmhouse in Wesley-street, Ossett. Drawings, etc., may be seen, and quantities, etc., obtained, at office of Messrs. C. H. Marriott, Son, & Shaw, Church-street-chambers, Dewsbury, on payment of 1*l.* 1s.

MARCH 17.—**Tadcaster.**—POLICE-STATION.—The West Riding Standing Joint Committee invite tenders for the works in connexion with the conversion of the Tadcaster Grammar School into a police-station, etc. Plans may be seen, and quantities obtained, on application to office of Mr. J. Vickers-Edwards, County Architect, County Hall, Wakefield. A deposit of 1*l.* is required. All deposits must be made payable to the West Riding Treasurer, and forwarded direct to him at the County Hall, Wakefield.

MARCH 17.—**Whiteabbey.**—WORKHOUSE WORKS.—Belfast Board of Guardians invite proposals for building and completing a coal shed, gate lodge and piggeries, fencing of grounds, making a roadway, and carrying out various other works at the Abbey Auxiliary Workhouse at Whiteabbey. Copy of schedule of quantities, etc., can be had from Messrs. M'Carthy & Brookes, building surveyors, Scottish Provident-buildings, on deposit of 2*l.* 2s.

MARCH 18.—**Brighton.**—CARPENTERS', ETC., WORK.—Brighton R.C. invite tenders for the performance of works:—(1) Carpenters' and joiners' work; (2) smiths' and ironfounders' work; (3) painters' and glaziers' work. Copies of the conditions of contract, etc., may be obtained on application at the office of the Borough Surveyor, at the Town Hall, Brighton.

MARCH 18.—**Cardiff.**—WAREHOUSE.—The erection of a new warehouse in Frederick-street, Cardiff, for Mr. G. Steer. Drawings, etc., may be seen, and bills of quantities obtained on payment of a deposit of 2*l.* 2s. Messrs. James & Morgan, FF.R.I.B.A., architects, Charles-street-chambers, Cardiff.

MARCH 18.—**Stoke-upon-Trent.**—ALTERATIONS.—Alterations at the Union Offices, Stoke-upon-Trent, where specifications may be had upon application and the plans inspected.

MARCH 19.—**Branksome.**—CLUB.—The erection of a new Liberal Club premises and hall at Branksome, Dorset. Plans, etc., can be obtained at the offices of the architects, Messrs. Smart & Wyeth, architects and surveyors, Bank-chambers, Ashley-road, Upper Parkstone, on deposit of 1*l.* 1s.

MARCH 19.—**Hackney.**—ROOF REPAIRS.—The Governors of the Hackney Institute invite tenders for certain repairs to the roofs of the Hackney Technical Institute, Dalston-lane, N.E. Specification of work and form of tender will be sent on receipt of stamped addressed foolscap envelope. Mr. A. Crew, Clerk to the Governors, Hackney Institute, Dalston-lane, N.E.

MARCH 19.—**Marshchapel.**—SCHOOL ALTERATIONS.—Lindsey C.C. Education Committee invite tenders for the alteration of an elementary school at Marshchapel, in the County of Lincoln. Bills of quantities, etc., may be had on application to Messrs. Scorer & Gamble, architects, Bank-street-chambers, Lincoln, on payment to them of 1*l.* 1s.

MARCH 19.—**Old Basford, Nottingham.**—COTTAGE.—The Works and Ways Committee invite tenders for the erection and completion of stabling, foreman's cottage, weigh-office, etc., at the new depôt, near Church-street, Old Basford. Drawings may be seen, and copy of the specification, etc., may be obtained, on applying to Mr. Arthur Brown, M.Inst.C.E., City Engineer, on payment of a deposit of 2*l.* 2s.

MARCH 19.—**Seacombe.**—GASWORKS.—Wallasey U.D.C. invite tenders for the construction of a gasholder tank, at the Gasworks, Dock-road, Seacombe, Cheshire. Plans may be inspected, and a copy of the specification, etc., obtained, on application to the engineer, Mr. J. H. Crowther, at his office, Dock-road, Seacombe, on payment of the sum of 5*l.*

MARCH 20.—**Blaenycwm.**—SCHOOL WORKS, ETC.—Rhondda U.D.C. invite tenders for the carrying out of the following works at the undernamed schools, namely:—(1) Extensions and alterations at Blaenycwm School; (2) extensions and alterations at Stanley School, Stanleytown; (3) conversion of part of the premises of Penygraig School into centres for cookery and handicraft; (4) improvements at Blaenrhondda School; (5) improvements to playground and master's house at Porth Boys' School; (6) construction and erection of an iron footbridge and other minor alterations at Blaenclydach School. Plans, etc., may be seen, and bills of quantities, etc., obtained, at the office of the architect, Mr. Jacob Rees, Hillside Cottage, Pentre, upon the production of a receipt from the Accountant of the Council for the required deposit of 1*l.* 1s. in respect of each of the works tendered for.

MARCH 20.—**Elgin.**—REBUILDING HOUSE.—For mason, carpenter, plumber, slater, plaster, painter, and ironwork in rebuilding and extending Avenue House, Elgin. Plans, etc., to be seen with Mr. R. B. Pratt, A.R.I.B.A., Town and County Bank-buildings, Elgin.

MARCH 20.—**Finglas.**—ADDITIONS TO HOUSE.—Alterations and additions to Cappagh House, Finglas, Convalescent Home in connexion with the Children's Hospital, Upper Temple-street. The plans, etc., can be seen at office of Messrs. William H. Byrne & Son, architects, 20, Suffolk-street, Dublin. Quantities have been prepared by Mr. D. W. Morris, 68, Harcourt-street, Dublin. Copies of same can be had on paying a deposit of 2*l.* 2s.

MARCH 21.—**Blackwood, etc.**—SCHOOLS.—Monmouthshire Education Committee invite tenders for:—(1) Erection of new mixed school and cookery centre at Blackwood, Mon. (quantities supplied on deposit of 2*l.* 2s.); (2) additions and alterations to Dukestown (Tredegar) Council School (quantities supplied on deposit of 1*l.* 1s.); (3) additions to Blaina Boys' Council School, Blaina, Mon.; (4) alterations to Panteg Wern Infants' School, Panteg, Mon. Plans, etc., can be seen upon application to Mr. C. Dauncey, Secretary, County Council Offices, Newport, Mon.

MARCH 21.—**Kinglassie.**—ALTERATIONS.—The mason and brick, carpenter and joiner, plumber, and cement and plaster works proposed to be executed in making alterations to Burnside-inn, Kinglassie, for Mr. Thomas M'Ewan. Schedules of quantities may be had on application to Messrs. Muirhead & Rutherford, architects and surveyors, 4, Abbey Park-place, Dunfermline.

MARCH 21.—**Forth.**—SHOPS.—The erection of two shops at Cemetery-road, Forth, for Mr. John Thomas. Plans, etc., may be seen at office of Mr. James T. Jenkins, architect and surveyor, Forth.

MARCH 23.—**Altrincham.**—BATHS.—The Altrincham U.D.C. invite tenders for the erection and completion of an extension of the present baths in Stamford New-road, Altrincham. Plans may be seen, and copies of the specifications, etc., may be obtained, on application to the architect, Mr. Percy D. Lodge, 34, John Dalton-street, Manchester, on payment of a deposit of 1*l.* 1s.

MARCH 23.—**Bailiff Bridge.**—VILLAGE CLUB, ETC.—The masons' and bricklayers', carpenters' and joiners', slaters' and plasterers', plumbers' and glaziers', concretors', and heating work required in the erection of a village club and institute at Bailiff Bridge. Plans, etc., may be seen, and bills of quantities obtained, at offices of Messrs. Joseph F. Walsh & Graham Nicholas, F.R.I.B.A., architects, Museum-chambers, Halifax. Deposit of 2s. 6d.

MARCH 23.—**Broad Hinton.**—CHURCH.—A small church at Broad Hinton, Wilts. Plans, etc., may be seen at the offices of the architects, Messrs. Read, Osborne, & Cook, Regent-circus, Swindon.

MARCH 23.—**Pendleton.**—STABLES.—Structural alterations, new stables, etc., for the proposed branch fire-station in Gardner-street, Pendleton. Plans may be seen, and bills of quantities, etc., obtained, at the Borough Engineer's office, Town Hall, Salford, on payment of 1*l.* 1s.

* MARCH 24.—**Liverpool.**—POST-OFFICE.—The Commissioners of H.M. Works, etc., invite tenders for the enlargement of the Southern District Post-office at Liverpool. For further particulars see advertisement in this issue.

* MARCH 24.—**West Norwood.**—ALMSHOUSES.—The Corporation of Wardens of St. Saviour, Southwark, S.E., invite tenders for two new almshouses at Hamilton-road, West Norwood, S.E. For further particulars see advertisement in this issue.

MARCH 25.—**Patfield.**—HOUSES.—The Lambton Collieries, Ltd., invite tenders for the building of fourteen colliery houses at Fatfield, about ten minutes' walk from Penshaw Station. Plans, etc., can be seen at the architect's office, Philadelphia Lime Depôt.

* MARCH 25.—**Hendon.**—SCHOOL.—The Hendon Education Committee invite tenders for new elementary school. For further particulars see advertisement in this issue.

MARCH 26.—**Birkenhead.**—LIBRARY.—The erection of the new central (Carnegie) library in Chester-street and Market-place South, Birkenhead, for the Birkenhead Library Committee. Plans, etc., may be seen at the offices of the architects, Messrs. W. Edwardes Sproat & Eldon Warwick, 18, Cook-street, Liverpool, where specifications, etc., may be obtained, upon payment of a deposit of 5*l.* 5s.

MARCH 27.—**Soothill Upper.**—PARTITIONS.—The Soothill Education Committee invite tenders for the builder, joiner, and plumber's work in connexion with the erection of partitions in Gregory-street Council School. Specifications to be had on application to Mr. William Wood, Divisional Clerk, Station-road, Batley.

MARCH 31.—**Grange Villa, Murton, etc.**—SCHOOLS.—The C.C. of Durham invite tenders for new Council Schools at Grange Villa (near West Pelton), Murton Colliery, and Chopwell. Plans, etc., may be seen, and bills of quantities obtained, as follows:—(1) For Grange Villa School (for about 600 scholars), at the office of Mr. Stephen Piper, architect, 5, Leafield-road, Darlington; (2) for Murton Colliery School (for about 1,300 scholars), at the office of Messrs. Clark & Moscrop, architects, Feethams, Darlington; (3) for Chopwell School (for about 600 scholars), at the office of Mr. W. H. Bendle, 33, Grainger-street West, Newcastle-on-Tyne.

MARCH 31.—**Lerwick.**—POST-OFFICE.—The Commissioners of H.M. Works and Public Buildings invite tenders for a new post-office at Lerwick. Drawings, etc., may be seen on application to H.M. Office of Works, Parliament-square, Edinburgh; or at the Post-office, Lerwick. Bills of quantities, etc., may be obtained at H.M. Office of Works, Edinburgh, on payment of 1*l.* 1s.

* APRIL 6.—**Cobham.**—RESIDENCE.—Tenders are invited for a country residence (for Mr. G. E. Andrews) at Cobham. For further particulars see advertisement in this issue.

NO DATE.—**Accrington.**—HOSPITAL EXTENSION.—Tenders are invited in all trades for the work of extensions to Accrington Victoria Hospital. Quantities will be supplied by Messrs. Haywood & Harrison, architects, Accrington, on the receipt of 1*l.* 1s.

NO DATE.—**Helsington.**—CHURCH WORKS.—Alterations and improvements proposed to be effected at the Church of St. John, Helsington, for the Vicar and Churchwardens. Names to Messrs. Oliver & Dodgshun, FF.R.I.B.A., architects, Carlisle, stating trades.

NO DATE.—**Kendal.**—EXTENSIONS.—Building extensions to the offices at Netherfield Works for Messrs. Somervell Brothers. Plans can be inspected, and bills of quantities obtained, on application at office of Mr. W. A. Nelson, architect, 98, Stricklandgate, Kendal.

NO DATE.—**Kirkby Malzeard.**—BUILDING.—Pulling down and rebuilding buildings at Kirkby Malzeard. Mr. Thomas Richmond, Spring House, Grewelthorpe, Ripon.

NO DATE.—**Lamorna, etc.**—ALTERATIONS.—Certain alterations to Mr. Jory's Hotel, Lamorna, and

Boleigh House, St. Buryan. Plans, etc., may be seen at Boskenna Estate Office, St. Buryan.

No DATE.—**Talke Pitts.**—CHAPEL.—For the erection of the new Primitive Methodist Chapel (seating 250) at Talke Pitts. Particulars on application to the architect, Mr. Henry Harper, 54, Long-row, Nottingham.

No DATE.—**Wesham.**—SCHOOL EXTENSION.—The reconstruction and extension of Primitive Methodist School, Wesham. Plans can be seen, and specifications, etc., had, on deposit of 10s. 6d. Mr. J. Hodgson, Secretary, 33, Fylde-street, Kirkham.

No DATE.—**Worcester Park.**—HOUSES.—A pair of semi-detached houses at Worcester Park, Surrey. Plans, etc., prepared by Messrs. Belfrage & Saville, architects, may be inspected at their offices, at 27, Chancery-lane, W.C.

ENGINEERING, IRON, AND STEEL.

MARCH 16.—**Knaresborough.**—RETORTS.—Providing and resetting of three beds of retorts (seven, five, and a four), and the construction of a new arch over the bed of four. Ingham's retorts to be quoted. Specifications can be obtained of Mr. Frank Cartlidge, surveyor, and particulars at the works.

MARCH 18.—**Anstruther.**—ROOF.—Anstruther and Cellardyke Gas Company, Ltd., Fife, invite tenders for supplying and erecting an iron roof over retort-house. Specification, etc., on application to Messrs. R. & G. Hislop, Gas Engineers, Underwood House, Paisley, on payment of 10s. (not returnable).

MARCH 18.—**Huddersfield.**—PLANT, ETC.—The Corporation of Huddersfield invite tenders for the excavating and construction of the foundations for turbo generating plants, condensing plant, pipe trenches, etc. Specifications, etc., may be obtained on application at the offices of the Borough Electrical Engineer, St. Andrew's-road, Huddersfield, and drawings may be inspected at the Electricity Works, St. Andrew's-road.

MARCH 18.—**Stafford.**—METER.—The Waterworks Committee of the Stafford Corporation invite tenders for a 12-in. water-meter. Particulars supplied on application to Mr. W. Blackshaw, Borough Engineer, Borough Hall, Stafford.

MARCH 19.—**Leeds.**—BOILERS.—Leeds Corporation Waterworks Committee invite tenders for the supplying and setting into position of two Lancashire boilers, 30 ft. by 8 ft. 6 in., with fittings complete, at the Arthington Pumping Station. Specifications, etc., may be had on application to Mr. Charles G. Henzell, Waterworks Engineer, Municipal Buildings, Leeds.

MARCH 21.—**Bridgeton.**—SLUDGE PRESSES.—The Corporation of Glasgow invite tenders for the supply, delivery, and erection of three sludge presses at the Dalmarnock Sewage Purification Works, Bridgeton. Specifications, etc., may be had on application to Mr. Thomas Melvin, General Manager, 30, Cochrane-street.

MARCH 21.—**Gelligaer.**—BRIDGE WIDENING.—Gelligaer and Rhigos R.D.C. invite tenders for erection of abutment, parapet, and wing walls, steelwork, laying down of kerb, channel, and pavement for the widening of the bridge near the Gwerthonor Hotel, Gilfach, in the Parish of Gelligaer. Plans, etc., can be seen, and bills of quantities obtained, upon application to the Council's Engineer and Surveyor, Mr. James P. Jones, F.I.S.E., Council Offices, Hengoed, *vid* Cardiff.

MARCH 23.—**Bradfield.**—IRON STAIRCASES.—The Guardians invite tenders for the construction and fixing of external iron staircases and other works to the workhouse, at Bradfield. Plans, etc., may be seen at the offices of Messrs. Charles Smith & Son, 164, Friar-street, Reading (Architects to the Board).

MARCH 23.—**Gillingham.**—METERS, ETC.—The Gillingham (Kent) B.C. invite tenders for the supply and delivery for twelve months of:—(*a*) Electricity meters; (*b*) lubricating oils. Copies of specifications, etc., may be obtained on application to the Borough Electrical Engineer, Generating Station, Gillingham-road.

MARCH 23.—**Hornsea.**—WELL AND PLANT.—Hornsea U.D.C. Waterworks Committee invite tenders for:—(1) For a well into the chalk about 150 ft. deep; (2) for suction gas engine, gas plant, and three-throw pumps. Drawings may be inspected at the Council's Offices, at Hornsea, or at the office of the Council's Consulting Engineers, Messrs. Maxted, Knott, & Coles, Burnett-avenue, Hull, from whom also specification, etc., may be obtained on payment of the sum of 1*l.* 1s. for each contract.

MARCH 23.—**Leeds.**—METERS.—Leeds Corporation Gas Committee invite tenders for the supply of dry gas meters. Form of tender may be had on application to Mr. R. H. Townsley, General Manager, Gas Offices, East Parade, Leeds.

MARCH 23.—**London.**—GIRDERS.—West London Extension Railway Company Directors invite tenders for the supply of about 43 tons of steel girders: Plans, etc., may be seen, and forms of tender, etc., obtained, at the office of the engineer, at the Paddington (G.W.R.) Station.

MARCH 23.—**Rawtenstall.**—ELECTRICITY SUPPLY.—Contract No. 9, direct and alternating current electricity meters; contract No. 10, economisers. Copies of the general conditions, etc., may be seen at the offices of the engineers, Messrs. Lacey, Sillar, & Leigh, 2, Queen Anne's-gate, Westminster, and 78, King-street, Manchester, and may be obtained from the former office only on payment of a deposit of 2*l.* 2s. for each contract.

MARCH 24.—**Aldham.**—BRIDGE.—Lexden and Winstree R.D.C. invite tenders for building a new bridge at Aldham. Plans, etc., can be seen by appointment at the office of Mr. John Ennals, surveyor, Lexden.

MARCH 26.—**Salford.**—RETORT-HOUSE FLOORS.—Salford Gas Committee invite tenders for the supply and erection of retort-house floors, retort fittings, and steel mains required at their Albion-street Works. The drawings may be seen, and copies of the specification, etc., obtained (for which a charge of 1*l.* 1s. will be made), on application to Mr. William W. Woodward, engineer, Bloom-street, Salford.

MARCH 27.—**Rawtenstall.**—ELECTRIC TRAMWAYS.—The Corporation invite tenders for the supply, delivery, and laying of steel rails, etc., of the tramways and all materials and labour for the paving, underbed, etc. Copies of the general conditions, etc., may be seen at the offices of the engineers, Messrs. Lacey, Sillar, & Leigh, 2, Queen Anne's-gate, Westminster, and 78, King-street, Manchester, and may be obtained from the former office only on payment of a deposit of 5*l.* 5s.

MARCH 27.—**Sunderland.**—TRAMWAY EXTENSIONS.—Sunderland District Electric Tramways, Ltd., invite tenders for three additional turnouts on their main lines between Philadelphia and Silksworth. Plans, etc., to be seen at the Company's offices by appointment with the Manager.

MARCH 28.—**Belfast.**—GIRDER RAILS.—The Belfast Harbour Commissioners invite tenders for the supply of about 100 tons of best rolled steel girder tramway rails, with fishplates and bolts to suit. Specification and any further information required may be obtained from the Harbour Engineer (Mr. W. Redfern Kelly, M.Inst.C.E.).

MARCH 30.—**Newcastle-upon-Tyne.**—QUAYSIDE IMPROVEMENT AND EXTENSION, QUAYSIDE RAILWAY.—The Corporation invite tenders (contract No. 1) for the supply and delivery of 400 tons steel railway rails and fishplates; also (contract No. 2) for the necessary points, crossings, and Manganese rails for turnouts for above works. Copy of the specification, etc., can be obtained, and drawings inspected, at the City Engineer's office, Town Hall, Newcastle-upon-Tyne, on payment of the sum of 1*l.* 1s. to the City Treasurer, Town Hall, Newcastle-upon-Tyne, for each specification, etc.

MARCH 30.—**Peover.**—BRIDGE WIDENING.—Widening the bridge which carries Bate Mill-road over the stream which divides the townships of Peover Superior and Lower Withington. Plans can be seen, and copies of the specification obtained, on application to Mr. Thomas Carswell, District Surveyor, 19, King Edward-street, Macclesfield, or to Mr. Joseph Burgess, District Surveyor, Tabley, Knutsford.

MARCH 31.—**Richmond.**—PUMPING MACHINERY.—Richmond Main Sewerage Board invite tenders for the construction, etc., of two pumping engines. Specification, etc., may be inspected at the office of Mr. William Fairley, civil engineer, 69, Victoria-street, Westminster; also at the pumping station where the machinery is to be installed, West Hall-road, Kew Gardens. A copy of the specification, etc., may be obtained on personal application, and deposit of a crossed cheque for 5*l.* 5s.

APRIL 16.—**Penzance.**—COOKING APPARATUS.—Penzance Guardians invite tenders for the supplying and erection of a steam cooking apparatus at the Union Workhouse, situate in the Parish of Madron. A specification of the work to be carried out may be seen on application to Mr. P. B. Corin, M.Inst.M.E., Causewayhead, Penzance.

MISCELLANEOUS.

MARCH 16.—**Croydon.**—METERS, ETC.—Croydon Electricity Department invite tenders for the supply of meters and house fuse and joint boxes. Forms of tender, etc., may be obtained on application at the Town Clerk's Office, Town Hall, Croydon.

MARCH 16.—**Sedgefield.**—LEADING-ROAD MATERIALS.—The R.D.C. of Sedgefield invite tenders for the leading of road materials for the year ending March 31, 1909. Forms of tender may be obtained on application to Mr. T. Griffiths-Roberts, surveyor, Sedgefield, Ferryhill.

MARCH 16.—**Wolstanton.**—SCAVENGING.—Wolstanton United U.D.C. invite tenders for the removal of house refuse, nightsoil, etc. A plan of the districts may be inspected, and forms of tender obtained, at the office of the Surveyor, Mr. F. W. Slater, Overhouse-chambers, Burslem.

MARCH 17.—**Basford.**—CARTING.—Basford R.D.C. invite tenders for team labour, "day and piecework," for the various parishes. All particulars, etc., may be obtained from Mr. Geo. W. Hawley, Highway Surveyor, Burton-buildings, Parliament-street, Nottingham.

MARCH 17.—**Basingstoke.**—HAULAGE.—Basingstoke R.D.C. invite tenders for the haulage of gravel and granite and supply and haulage of flints in various parishes. Tender forms can be obtained of the Surveyor, Mr. R. Forrester, Chequers-road, Basingstoke.

MARCH 17.—**Hereford.**—HAULING.—Hereford R.D.C. invite tenders for hauling. Forms, etc., can be obtained from Mr. H. Bishop, surveyor, Moreton-on-Lugg, Hereford, or from Mr. P. R. Gibbs, surveyor, 15, Whitecross-road, Hereford.

MARCH 17.—**Lancing.**—SCAVENGING.—Steyning West R.D.C. invite tenders for the removal of house refuse and cleansing of ashpits. The plan of the defined area is deposited at the office of the Clerk of the P.C. of Lancing.

MARCH 17.—**Okehampton.**—PULLING DOWN.—Pulling down old two-story buildings and outbuildings, etc., complete, and clearing site down to ground line of premises situated on Fore-street, Okehampton, Devon. Specification, etc., can be obtained from the Manager, Lloyds Bank, Ltd., Okehampton.

MARCH 17.—**Runcorn.**—WORKS.—Tenders for the services per hour of journeymen and apprentices of the following trades:—Plumber, joiner, whitesmith, and bricklayer. Mr. Geo. F. Ashton, Clerk to the Guardians.

MARCH 17.—**Shoreham.**—SCAVENGING.—Steyning West R.D.C. invite tenders for the removal of house refuse and cleansing of ashpits from the houses situate in Buckingham-road, Gordon-road, and Rosslyn-road, in the Parish of Old Shoreham. Mr. Arthur Flowers, Solicitor and Clerk to the Council, Union Offices, New Shoreham, Sussex.

MARCH 17.—**Southwell.**—CARTING.—Southwell R.D.C. invite tenders for carting road material in the parishes comprising the North and South Districts. Forms of tender may be obtained for the North District from Mr. Richard Woolhouse, Highway Surveyor, Caunton, Newark, and for the South District from Mr. Robert Morris, Highway Surveyor, Southwell.

MARCH 17.—**Steyning.**—SCAVENGING.—Steyning West R.D.C. invite tenders for the removal of house refuse and cleansing of ashpits from the Parish of Steyning. Mr. Arthur Flowers, Solicitor and Clerk to the Council, Union Offices, New Shoreham, Sussex.

MARCH 17.—**Watford.**—HORSE HIRE.—Watford R.D.C. invite tenders for horse hire for watering various roads at Radlett and Nascot Park Estate, Watford. A specification can be seen, and form of tender, etc., obtained, on application to the Council's Surveyor, Mr. Ernest Lailey, 9, Market-street, Watford.

MARCH 17.—**Willesden.**—FIRE-ESCAPE.—The Willesden D.C. invite tenders for the supply of a 50-ft. horizontal fire-escape. Conditions, etc., can be obtained upon application to Mr. O. Claude Robson, M.Inst.C.E., Engineer to the Council, Public Offices, Dyne-road, Kilburn, N.W. A 10*l.* note to be enclosed with each tender.

MARCH 18.—**Basingstoke.**—ROAD ROLLING.—Basingstoke R.D.C. invite tenders for steam road rolling. Specification can be obtained from the Surveyor, Mr. R. Forrester, Chequers-road, Basingstoke, by sending him a stamped addressed foolscap envelope.

MARCH 18.—**New Sarum.**—HORSE HIRE AND HAULAGE.—The U.D.C. invite tenders for the hire of horse and cart, including man, per day. Also tenders undertaking work of haulage at per ton. Mr. Francis Hodding, Town Clerk, Municipal Offices, Salisbury.

MARCH 18.—**Watford.**—CARTING.—The Metropolitan Asylums Board invite tenders for the cartage of soda from Watford Station, Leavesden Asylum, near Kings Langley, R.S.O., Herts. Forms of tender can be obtained at the office of the Board, Embankment, London, E.C.

MARCH 20.—**Fareham.**—CARTING.—The R.D.C. of Fareham invite tenders for haulage and hire carting. Forms of tender may be obtained on application at the Union Offices, West-street, Fareham.

MARCH 20.—**Penryn.**—DEMOLITION OF BRIDGE.—Cornwall C.C. Highways and Bridges Committee invite tenders for the purchase of the cast iron, iron ballasting, and other materials of Penryn swing bridge, including the demolition and removal of same. Particulars may be obtained on application to Mr. A. E. Brookes, County Surveyor (Western Division), St. Ives, Cornwall.

MARCH 20.—**Wortley.**—CARTING.—Particulars and forms of tender for carting materials within Wortley district may be obtained before March 20, on application to Mr. F. Crawshaw, surveyor, Loxley, and 45, Exchange-street, Sheffield.

MARCH 21.—**Blaby.**—LABOUR.—Blaby R.D.C. (Highway Authority) invite tenders for the cartage of granite. Forms to be obtained at office of Mr. George E. Bouskell, Clerk to the Council, 27, Friar-lane, Leicester.

MARCH 21.—**Shifnal.**—HAULING.—Shifnal and Blymhill R.D.C. invite tenders for team work. Forms of tender may be obtained from Mr. Geo. H. Stevenson, Surveyor, Shifnal.

MARCH 23.—**Weymouth.**—LABOUR.—Weymouth R.D.C. invite tenders for the repair of the district roads for three years. Forms of tender, etc., may be obtained from the Council's Surveyor, Mr. R. H. Luckham, of Broadwey.

* MARCH 24.—**East Ham.**—SCAVENGING.—The East Ham T.C. invite tenders for scavenging of the streets in the borough for three years, from April 1 next. For further particulars see advertisement in this issue.

MARCH 26.—**Richmond.**—LEADING STONE.—Richmond R.D.C. invite tenders for leading stones to the roads within the district. Forms of tender, etc., may be obtained on application to the surveyor, Mr. John Hodgson, North Cowton, Darlington.

MARCH 27.—**Glasgow.**—SCAVENGING.—Scavenging of household and other refuse within the area known and defined as the "Cambuslang Special Scavenging District." Printed conditions of the contract, etc., may be had on application to Mr. J. T. T. Brown, Clerk, 97, West Regent-street, Glasgow.

MARCH 28.—**Chester.**—CARTING.—Cheshire C.C. invite tenders for carting macadam and other materials. Forms of tender, etc., at the County Surveyor's Office, Chester Castle.

MARCH 28.—**Cockerton.**—SCAVENGING.—Darlington R.D.C. invite tenders for scavenging the Parish of Cockerton. Form of tender may be had on application to Mr. William Pallister, Union Offices, Darlington.

MARCH 28.—**Darlington.**—SCAVENGING.—Darlington R.D.C. invite tenders for scavenging the Parish of Middleton-St.-George. Form of tender may be had on application to Mr. William Pallister, Union Offices, Darlington.

PAINTING, etc.

MARCH 16.—**Gosforth.**—PAINTING.—The Committee of Visitors of the Newcastle-upon-Tyne City Lunatic Asylum, Gosforth, invite tenders for painting. Form of tender may be had on application to the Clerk of the Asylum

MARCH 16.—**Huddersfield.**—PAINTING.—The Corporation of Huddersfield invite tenders for the painting of the whole of the interior woodwork and ironwork in connexion with the Market Hall, King-street, and the painting of the outside woodwork and ironwork, and the french polishing of shop fronts. Plans, etc., may be seen, and bills of quantities, etc., obtained, on application at the offices of Mr. K. F. Campbell, M.Inst.C.E., Borough Engineer and Surveyor, 1, Peel-street.

MARCH 16.—**Nottingham.**—PAINTING.—Painting, cleaning, and papering at the Training Institution, Hartley-road, Nottingham. Form of tender, etc., may be obtained at office of Mr. G. Muncaster Howard, Clerk to the Board, Poor Law Offices, Shakespeare-street, Nottingham.

MARCH 16.—**Southampton.**—PAINTING.—The Corporation invite tenders for executing certain painting, distempering, and other works at the police-stations in the Borough. Specification, etc., may be obtained at the Borough Engineer's Office upon the production of the Borough Treasurer's receipt for a deposit of 1*l.* 1s.

MARCH 17.—**Radstock.**—PAINTING, ETC.—The U.D.C. of Radstock invite tenders to carry out the external and internal painting and decoration of the Victoria Hall and adjacent buildings. Specifications, etc., may be obtained from the Council's Surveyor, Mr. George H. Gibson, Radstock, Bath.

* MARCH 18.—**London.**—PAINTING, ETC.—The Guardians of the St. George's Union invite tenders for painting, distempering, general repairs, etc., at their Children's Home in Millman's-street, Chelsea, S.W. For further particulars see advertisement in this issue.

MARCH 18.—**Portsmouth.**—PAINTING.—Painting, etc., the seats, railings, etc., on Southsea Beach and Common and at or near the Canoe Lake and the Pembroke Gardens, Southsea, in the Borough of Portsmouth. The specification may be seen, and a form of tender obtained, at the Borough Engineer's Office at the Town Hall.

* MARCH 18.—**Various Towns.**—CLEANING AND PAINTING.—The Directors of the Midland Railway Company invite tenders for cleaning and painting works at various stations, etc. For further particulars see advertisement in this issue.

MARCH 20.—**Salisbury.**—PAINTING.—Salisbury Infirmary Committee of Management invite tenders for repainting the whole of the staircases and passages of the Hospital. Also for cleaning and distempering wards and offices. Tenders are also invited for lining the scullery walls with white glazed tiles and repainting kitchen and offices. Specifications may be seen, and quantities obtained, upon application to Mr. M. Harding, High-street, Salisbury.

MARCH 28.—**Coventry.**—PAINTING.—The Trustees of the Coventry Charity invite tenders for painting the outside of the Hospital, in accordance with a specification which may be seen at office of Mr. Frank Holyoake, Secretary, Droitwich.

MARCH 28.—**Stafford.**—PAINTING.—The Corporation invite tenders for painting at the sanitary depôt premises, Lammascotes-road. Forms of tender, etc., can be obtained on application to Mr. W. Blackshaw, Borough Engineer and Surveyor, Borough Hall, Stafford.

ROADS, SANITARY, AND WATER WORKS.

MARCH 14-APRIL 6.—**Auckland.**—SEWERAGE DISPOSAL.—The R.D.C. of Auckland invite tenders for the execution of a scheme of main sewerage and sewage disposal for South Church, Coundon Grange, Eldon-lane, Close House, Eldon, Auckland Park, and Cockton Hill, near Bishop Auckland, in the County of Durham. Names and addresses not later than March 14, to the engineers for the works, Messrs. D. Balfour & Son, civil engineers, 3, St. Nicholas's-buildings, Newcastle-on-Tyne, accompanied by a cheque for 5*l*.

MARCH 16.—**Newport.**—STREET IMPROVEMENTS.—Newport, Isle of Wight, T.C. invite tenders for the execution of certain works of street improvement in the Borough and for the erection of a cupboard for drying fire hose. Plans, etc., may be seen, and forms of tender obtained, at office of Mr. T. Ross Pratt, Town Clerk, 19, Quay-street, Newport, I.W.

MARCH 18-APRIL 6.—**Haughton-le-Skerne.**—MAIN SEWERAGE.—The R.D.C. of Darlington invite tenders for the execution of a scheme of main sewerage for Haughton-le-Skerne, in the County of Durham. Names and addresses not later than March 18 to the Engineers for the Works, Messrs. D. Balfour & Son, civil engineers, 3, St. Nicholas's-buildings, Newcastle-on-Tyne, accompanied by a cheque for 5*l*.

MARCH 18.—**Highbridge (Somerset).**—SEWERAGE WORKS.—Highbridge U.D.C. invite tenders for the works in connexion with the sewering of a portion of their district. Further particulars, etc., may be obtained, and plans, etc., may be seen, at the office of the Engineer, Mr. W. Press, 41, College-street, Burnham, Somerset. Intending contractors will be required to deposit a sum of 2*l*. prior to particulars being furnished.

MARCH 18.—**West Rainton.**—WATER PIPES.—The Houghton-le-Spring and Hetton Joint Small-pox Hospital Board invite tenders for the laying of about 900 yds. of 3-in. metal water pipes with necessary valves, etc., including the cutting and filling in of the track, from Benridge Bank Top, West Rainton, to their small-pox hospital, situate near the Alexandrina Colliery, West Rainton. A plan, etc., may be seen during office hours at office of Mr. J. G. Baty, in William-street, Houghton-le-Spring.

MARCH 19.—**Brownedge.**—RESERVOIR.—Staffordshire Potteries Waterworks Company Directors invite tenders for the construction of a covered concrete reservoir, of about 900,000 gallons capacity, at Brownedge, near Endon, together with trench work and carting pipes for about three-quarters of a mile of 15-in. main. Copy of the specification, etc., may be obtained on payment of 1*l*.

MARCH 19.—**Salford.**—PAVING.—Paving and flagging certain streets and passages in the neighbourhood of Springfield-lane for the Health Committee. Plans may be seen, and specified quantities, etc., obtained, at the office of the Borough Engineer, Town Hall, Salford.

MARCH 23.—**Finchley.**—MAKING-UP.—The U.D.C. invite tenders for the making-up of private streets. Plans, etc., may be seen at the offices of the Council's Engineer and Surveyor, and copies of schedules, etc., will be supplied on the deposit of 1*l*. in respect of the documents for each street. Mr. E. H. Lister, Clerk to the Council, Council Offices, Church End, Finchley, N.

MARCH 23.—**King's Lynn.**—PAVING.—The Corporation invites tenders for paving St. James'-street with wood blocks. Specification, etc., may be obtained, and plans may be seen, on application to Mr. J. H. Webb, Borough Surveyor, Town Hall, King's Lynn.

MARCH 23.—**Poole.**—RESERVOIRS.—Poole B.C. invite tenders for the construction of two concrete covered service reservoirs. Conditions, etc., can be obtained upon application at the Waterworks Department, and after payment to Mr. Charles Lisby, Town Clerk, the Town Clerk's Office, Municipal Offices, Poole, of a fee of 2*l*. 2s. The drawings may be inspected between the hours of 10 a.m. and 4 p.m. from March 9 to 20 inclusive, at the Waterworks Department, Municipal Offices, Poole. Bills of quantities can be obtained from the Quantity Surveyor, Mr. E. T. Hildred, 1, High-street, Gosport.

MARCH 23.—**Selston, Basford.**—STREET WORKS.—Basford R.D.C. invite tenders for the making-up of private streets in the Parish of Selston. Drawings, etc., may be seen on application to Mr. Geo. W. Hawley, Surveyor to the Council, Burton-buildings, Parliament-street, Nottingham, on payment of a deposit of 2*l*. 2s.

MARCH 23.—**Weymouth.**—ROAD WORKS.—Weymouth R.D.C. invite tenders for the repair of the district roads for three years. Forms of tender, etc., may be obtained from the Council's Surveyor, Mr. R. H. Luckham, of Broadwey.

MARCH 24.—**Preston.**—WATERWORKS.—The Corporation of Preston invite tenders for the works required in pitching the inner slopes of the middle reservoir, new straining chambers, meter-houses, and other works. Specification, etc., may be obtained on application to Mr. Thomas Cookson, A.M.Inst.C.E., Town Hall, Preston, on payment of 2*l*. 2s.

MARCH 24.—**Southampton.**—STORM-WATER DRAIN.—The Corporation invite tenders for the construction of a storm-water drain at Bevois Valley. Plans, etc., can be inspected, and bills of quantities, etc., obtained, at the Borough Engineer's Office, upon production of the Borough Treasurer's receipt for a deposit of 3*l*. 3s.

MARCH 25.—**Highbridge.**—SEWERING.—Highbridge U.D.C. invite tenders for the works in connexion with the sewering of a portion of their district. Further particulars and form of tenders, etc., may be obtained, and plans, etc., may be seen, at the office of the engineer, Mr. W. J. Press, 41, College-street, Burnham, Somerset.

MARCH 25.—**Maldon.**—WATER MAINS.—The T.C. invite tenders for the supply of about 300 yds. of 8-in. cast-iron water mains. Specifications, etc., may be had on application to the Borough Surveyor, Municipal Offices, Maldon.

MARCH 30.—**Havant, Hants.**—MAIN SEWERAGE WORKS.—The U.D.C. of Havant invite tenders for constructing and maintaining about 220 yds. of 9-in. stoneware pipe sewers, and about 980 yds. of 9-in. and 730 yds. of 8-in. cast-iron pipe sewers, in Eastern and Grove roads, and the Western or Staunton-road District respectively. Plans, etc., may be inspected, and bills of quantities, etc., obtained, at the offices of the engineers, Messrs. Lemon & Blizard, MM.Inst.C.E., Lansdowne House, Castle-lane, Southampton, upon depositing the sum of 3*l*. 3s.

MARCH 30.—**Seghill.**—SEWERS.—The Seghill U.D.C. invite tenders for the construction of about 1,800 yds. of earthenware and cast-iron pipe sewers at Seghill Colliery. Plans, etc., may be seen, and quantities, etc., obtained, on application to the engineer, Mr. J. E. Parker, A.M.Inst.C.E., Post-Office-chambers, Newcastle-upon-Tyne, on depositing a cheque for 1*l*. 1s.

NO DATE.—**Hornsea.**—EXTENSION OF WATERWORKS.—Hornsea U.D.C. Waterworks Committee invite tenders for:—(1) For a well, into the chalk, about 150 ft. deep; (2) for suction gas engine, gas plant, and three-throw pumps. Drawings may be inspected at the Council's Office at Hornsea or at the office of the Council's consulting engineers, Messrs. Maxted, Knott, & Coles, Burnett-avenue, Hull, from whom also specification, etc., may be obtained on payment of the sum of 1*l*. 1s. for each contract.

NO DATE.—**Portscatho.**—DRAINAGE.—Truro R.D.C. invite tenders for excavating for and the providing and laying of, about 160 lin. yds. of 6-in. glazed, socketted pipe sewers, etc. Mr. E. W. Tonkin, Sanitary Inspector, Tregoney.

NO DATE.—**Tunstall (Staffs).**—MAKING-UP.—For making-up Newfield-street, for the U.D.C. Plans, etc., may be obtained upon application to Mr. A. R. Wood, Surveyor, Town Hall, Tunstall.

STONE, MATERIALS, AND STORES.

MARCH 16.—**Bolton.**—MATERIALS.—The Tramways Committee of the Bolton Corporation invite tenders for materials and stores. Forms, etc., may be obtained on application to Mr. Arthur A. Day, General Manager, Tramways Offices, Bradshaw-gate, Bolton.

MARCH 16.—**Chadderton.**—ANNUAL CONTRACTS.—The U.D.C. invite tenders for the supply of materials. Conditions, etc., may be had on application at the Surveyor's Office, Town Hall.

MARCH 16.—**Cheshunt.**—GRANITE.—Cheshunt U.D.C. invite tenders for 500 tons, more or less, of Aberdeen granite. Particulars, etc., may be obtained on application to Mr. R. H. Jeffes, A.M.Inst.C.E., Engineer and Surveyor to the Council, Manor House, Cheshunt.

MARCH 16.—**Chester-le-Street.**—MATERIALS.—The Highways Committee of the R.D.C. invite tenders for:—(1) The supply of whinstone, limestone, and blastfurnace slag, and (2) the carting of the same. Forms of tender, etc., may be obtained from Mr. Geo. W. Ayton, Highway Surveyor, Chester-le-Street.

MARCH 16-MARCH 23.—**Heywood.**—MATERIALS.—The Corporation invite tenders for the supply of materials. Samples, etc., may be seen, and form obtained, on application to Mr. J. Ainsworth Settle, A.M.Inst.C.E., Borough Engineer.

MARCH 16.—**Hindley.**—STORES.—Hindley U.D.C. invite tenders for stores. Forms of tender may be obtained on application to the Gas Engineer, Mr. H. O Timmins, Gas Works, Hindley.

MARCH 16.—**Melton Mowbray.**—GRANITE.—The Melton Mowbray R.D.C. invite tenders for the supply of about 6,500 tons of XX and XXX broken granite, and about 2,600 tons of XX and XXX broken slag. Forms of tender may be obtained at office of Mr. Arthur H. Marsh, Clerk.

MARCH 16.—**Nelson.**—ANNUAL CONTRACTS.—Nelson Plans and Buildings Committee invite tenders for the supply and delivery of materials. Specifications, etc., may be obtained on application at the office of Mr. B. Ball, A.M.Inst.C.E., Borough Engineer and Surveyor.

MARCH 16.—**Newark.**—ROAD MATERIAL.—The R.D.C. invite tenders for the supply of about 350 tons of granite and 2,250 tons of slag, and 70 tons of tar macadam. District Surveyor, Board-room, The Ossington, Newark.

MARCH 16.—**Soulcoates.**—GRAVEL, ETC.—Soulcoates R.D.C. invite tenders for the supply of whinstone, granite, and gravel. Particulars, etc., may be obtained from Mr. A. Greaves, Surveyor, Woodbine Villa, Hessle.

MARCH 16.—**Sevenoaks.**—MATERIALS, ETC.—Sevenoaks U.D.C. invite tenders for manhole covers, gulley grates, shovels, stone forks, etc. Particulars may be obtained of Mr. Samuel Towlson, A.M.Inst.C.E., Surveyor to the Council, at his office, Argyle-road, Sevenoaks.

MARCH 16.—**Southampton.**—STORES, FITTINGS, ETC.—The Corporation invite tenders for the supply of stores, fittings, etc., required in the Electricity and Tramways Departments. Specification, etc., to be obtained upon application to Mr. H. F. Street, General Manager, at the Tramway Offices, Above Bar-street, Southampton.

MARCH 16.—**Steyning.**—FLINTS.—Steyning West R.D.C. invite tenders for flints. Forms of tender can be obtained on application to Mr. Arthur Flowers, Solicitor and Clerk to the Council, Union Offices, New Shoreham, Sussex, or of the Surveyor of the Council, Mr. F. Slaughter, High-street, Steyning.

MARCH 17.—**Biggleswade.**—GRANITE.—The Guardians invite tenders for the supply of granite. Forms of tender etc., can be obtained on application to Mr. G. Wagg, Clerk to the Guardians, Biggleswade.

MARCH 17.—**Blackrock.**—MATERIALS.—The U.D.C. of Blackrock invite tenders for supplies for the year. Forms of tender can be obtained on application at office of Mr. R. Finlay Heron, Town Clerk, Town Clerk's Office, Town Hall, Blackrock, Co. Dublin.

MARCH 17.—**Caerphilly.**—LIMESTONE.—Caerphilly U.D.C. invite tenders for supply of broken limestone. The specifications can be seen, and form of tender obtained, at the Council Offices.

MARCH 17.—**Leeds.**—MATERIALS.—Leeds Guardians invite tenders for paints and oils, engineer's materials, etc. Forms from Mr. James H. Ford, Clerk to the Guardians, Poor Law Offices, South-parade, Leeds.

MARCH 17.—**Rothwell.**—MATERIALS.—Rothwell U.D.C. invite tenders for the supply of materials, etc. Specifications, etc., may be obtained on application to Mr. J. Southwart, Surveyor, Council Offices, Rothwell, near Leeds.

MARCH 17.—**St. Helens.**—MATERIALS.—St. Helens Corporation invite tenders for the supply and delivery of materials for a period of twelve months. Conditions, etc., can be obtained upon application to Mr. Geo. J. C. Broom, M.Inst.C.E., the Borough Engineer, at his office at the Town Hall.

MARCH 17.—**Stoke-upon-Trent.**—SUPPLIES.—The Guardians invite tenders for the supply of articles. Forms of tender, etc., may be obtained upon application to offices of Mr. C. Daniel, Clerk to the Guardians, Union Offices, Stoke-upon-Trent.

MARCH 17.—**Stone.**—ARTICLES.—Stone Union Guardians invite tenders for the supply of articles. Forms can be obtained gratis on application at office of Mr. J. Buckley Norris, Clerk, 21, High-street, Stone.

MARCH 18.—**Aylesbury.**—MATERIALS.—Aylesbury U.D.C. invite tenders for the supply of materials and stores. Specifications, etc., may be obtained on application to Mr. W. H. Taylor, Surveyor to the Council, Town Hall, Aylesbury, on receipt of a stamped addressed foolscap envelope.

MARCH 18.—**Darlington.**—ARTICLES.—The Corporation invite tenders for the supply of articles during the year ending March 31, 1909. Further particulars and forms of tender may be obtained on application at the offices of Mr. George Winter, Borough Surveyor and Waterworks Engineer, Town Hall.

MARCH 18.—**Easingwold.**—WHINSTONE.—The R.D.C. of Easingwold invite tenders for whinstone, slag, etc. Forms to be obtained at office of Mr. F. J. H. Robinson, Clerk, Easingwold.

MARCH 18.—**Ely.**—ROAD MATERIAL.—Ely R.D.C. invite tenders for 2,780 tons of granite, 1,745 yds (or tons) of gravel, and 120 yds. (or tons) of clunch. Forms on application to Mr. F. W. Firby, District Surveyor, Chiefs-street, Ely.

MARCH 18.—**Ilkley.**—ROAD MATERIALS.—Ilkley U.D.C. invite tenders for limestone, granite, and tar macadam. Mr. Frank Hall, Clerk, Council Offices, Ilkley.

MARCH 18.—**Leek.**—MATERIALS.—Leek U.D.C. Paving and Sewering Committee invite tenders for the supply and delivery of materials. Specification, etc., may be obtained upon application to Mr. W. E. Beacham, C.E., Surveyor and Water Engineer, Town Hall, Leek.

MARCH 18.—**Leigh.**—MATERIALS.—The Leigh and Atherton Joint Sewerage Board invite tenders for materials. Mr. D. Schofield, Clerk, Town Hall, Atherton.

MARCH 18.—**London.**—SANITARY APPLIANCES.—St. Pancras Guardians invite tenders for certain sanitary appliances, in accordance with specification and sketch plans to be seen at office of Mr. Alfred A. Millward, Clerk to the Guardians, Town Hall, Pancras-road, N.W.

MARCH 18.—**Oldham.**—MATERIALS.—The Surveyor's Committee invite tenders for the supply of materials. Specifications, etc., may be obtained on application at the Borough Surveyor's Office, Town Hall, Oldham.

MARCH 18.—**Rochdale.**—ARTICLES.—The Paving, etc., Committee invite tenders for the supply and delivery of articles during the year. Forms of tender may be obtained at the Borough Surveyor's Office, Town Hall, Rochdale.

MARCH 18.—**Turton.**—MATERIALS, ETC.—Turton U.D.C. invite tenders for the year ending March 31, 1909, for team labour, also for materials and stores. Further particulars, etc., may be obtained from the Surveyor at the Council Offices, Bromley Cross, near Bolton.

MARCH 19.—**Cuckfield.**—MATERIALS.—The Board of Guardians invite tenders for bricklayers', carpenters', plumbers', painters', and ironmongers' materials and work as per scheduled prices. Forms must be obtained of Mr. Edward J. Waugh, Clerk, Haywards Heath.

MARCH 19.—**Darlington.**—STORES.—Darlington Corporation Gas Committee invite tenders for the

supply of general stores. Further particulars and forms of tender may be obtained on application to Mr. Frank P. Tarratt, Engineer and Manager, Gasworks, Darlington.

MARCH 19. — **Leeds.** — MATERIALS.—Leeds Waterworks Committee invite tenders for stores. Forms may be had on application to Mr. Charles G Henzell, Waterworks Engineer, Leeds.

MARCH 19.—**Stafford.**—STORES, ETC.—Staffordshire C.C. invite tenders for the supply and cartage of road materials, tools, and road implements for the six districts in the county. Specifications, etc., can be obtained on application to Mr. James Moncur, Chief Surveyor of Main Roads, County Buildings, Stafford.

MARCH 19.—**Warrington.**—MATERIALS.—The Visiting Committee of Lancashire County Asylum, Winwick, Warrington, invite tenders for the supply of goods. Samples can be seen at the Asylum.

MARCH 19. — **Wolverhampton.** — STORES. — The Tramways Committee invite tenders for the supply of general stores. Forms of tender may be obtained on application to Mr. W. A. Luntley, the General Manager, at the Car Depôt, Cleveland-road, Wolverhampton.

MARCH 20.—**Altrincham.**—MATERIALS.—Altrincham U.D.C. invite tenders for the supply of flags, curbs, Rawtenstall setts, macadam, granite setts and chippings, limestone chippings, stoneware pipes, and brushes. Forms of tender, etc., may be obtained at the office of Mr. H. E. Brown, Surveyor to the Council, Town Hall, Altrincham.

MARCH 20. — **Crompton.** — MATERIALS.—Crompton U.D.C. solicit tenders for the supply during the year ending March 31, 1909, of materials. Further particulars and forms of tender may be obtained on application to Mr. F. F. Gartside, Clerk and Surveyor, Town Hall, Shaw.

MARCH 20.—**Greenwich.**—MATERIALS.—The B.C. of Greenwich invite tenders for road materials (one year) and tar paving composition (one year). Schedules, etc., can be obtained from the Borough Engineer and Surveyor's Office, Town Hall, Greenwich-road, S.E.

MARCH 21. — **Blaby.** — GRANITE. — Blaby R.D.C. (Highway Authority) invite tenders for the supply of granite. Forms may be obtained at office of Mr. George E. Bouskell, Clerk to the Council, 27, Friarlane, Leicester.

MARCH 21. — **Clayton-le-Moors.** — MATERIALS.—Clayton-le-Moors U.D.C. invite tenders for the supply of:—(1) Flags, channels, kerbs, setts, and broken granite; (2) earthenware pipes; (3) ironwork. Forms of tender may be obtained on application to Mr. A. Dodgeon, Surveyor to the Council, Council Offices, Clayton-le-Moors.

MARCH 21. — **Driffield.**—ROAD MATERIALS.—Driffield R.D.C. invite tenders for road material. Particulars and forms of tender can be obtained on application to Mr. T. Casson Beaumont, Surveyor, Driffield (stamped addressed envelope).

MARCH 21.—**Dunfermline.**—STONE.—The Dunfermline District Committee of the Fife C.C. invite tenders for the quarrying and hand-breaking of quantities of stone. Copies of the specification, etc., may be obtained at the office of Mr. David Mackenzie, C.E., District Road Surveyor, County Buildings, Dunfermline.

MARCH 21.—**Egremont.**—STEEL TUBES.—The Egremont U.D.C. invite tenders for the supply of 4,250 yds. of 6-in. British Mannesmann steel tubes and thirty special fittings, to reach Mr. John Bowly, Clerk, at the Town Hall, Egremont, Cumberland.

MARCH 21. — **Ipswich.**—STORES.—Ipswich Corporation invite tenders for the stores required for the twelve months. Copy of specification, etc., can be obtained from Mr. Frank Ayton, Chief Engineer and Manager.

MARCH 21.—**Lanark.**—MATERIALS.—The County of Lanark District of the Middle Ward Committee invite tenders for supplying tools and implements, fencing materials, and drain pipes required in connexion with the highways for a period of one or three years. Copies of the specification, etc., may be obtained from Mr. James Watson, Road Surveyor, Strathaven; Mr. John Clarke, Road Surveyor, Hamilton; Mr. William A. Chapman, Road Surveyor, Airdrie.

MARCH 21. — **Leeds.** — TUBES AND FITTINGS.—Leeds Corporation Gas Committee invite tenders for the supply of wrought-iron tubes and fittings. Form of tender may be had on application to Mr. R. H. Townsley, General Manager, Gas Offices, East-parade, Leeds.

MARCH 21.—**Pontefract.**—ROAD MATERIALS.—Pontefract R.D.C. invite tenders for road materials. Forms of tender may be obtained on application to Mr. J. Dickon Smith, Clerk, Union Offices, Pontefract.

MARCH 21. — **Repton.** — ROAD MATERIALS.—Repton R.D.C. invite tenders for road materials and cartage. Printed forms of tender, etc., may be obtained from Mr. C. F. Chamberlin, Clerk, Union Offices, Burton-on-Trent, or from Mr. T. R. Sidgwick, Surveyor of Highways, Willington, Derby.

MARCH 21. — **Shardlow.** — MATERIALS.—Shardlow R.D.C. invite tenders for the supply and delivery of granite, etc. Particulars, etc., to be obtained from Mr. John S. Wooddisse, Surveyor to the said Council, Aston-on-Trent, Derby.

MARCH 21. — **Swindon.** — ANNUAL TENDERS FOR MATERIALS.—The Corporation of Swindon invite tenders for the supply and delivery of materials. Forms of tender, etc., can be obtained on written application to the Tramway Manager, Mr. T. Medcalf, Electricity Works, Swindon.

MARCH 21. — **Tonbridge.** — MATERIALS.—Tonbridge R.D.C. invite tenders for the supply of chert, basalt, penlee, rag, and quartzite, etc. Also the haulage of materials. Forms of tender, etc., may be had on application to Mr. Frank Harris, Engineer and Surveyor, Broadway, Southborough, Tunbridge Wells.

MARCH 23.—**Atcham.**—MATERIALS.—The Guardians invite tenders for building materials (with samples), timber, oils, colours, glass, etc. Mr. Joseph Everest, Clerk to the Guardians, Atcham Union Offices, St. John's Hill, Shrewsbury.

MARCH 23.—**Bridge.**—ROAD MATERIAL.—The R.D.C. of Bridge invites tenders for the supply of surface-picked and other hard flints and gravel; also for carting out stones, and for the supply of horse, cart, and man. Forms must state the names of the parish or parishes for which applicants wish to tender.

MARCH 23.—**East Ashford.**—FLINTS.—The R.D.C. invite tenders for the supply and delivery of flints, and also for the haulage of rock and gravel. Forms of tender, etc., may be obtained from Mr. T. W. Pullen, Surveyor, Kennington.

MARCH 23.—**Gainsborough.**—ANNUAL CONTRACTS.—Gainsborough U.D.C. invite tenders for the supply and delivery of materials. Specification, etc., may be obtained by written application, addressed to the Engineer and Surveyor, Council Offices, Gainsborough.

MARCH 23.—**Truro.**—ANNUAL CONTRACTS.—The City Council invite tenders for the supply of materials. Specifications, etc., at office of Mr. Measham Lea, A.M.Inst.C.E., City Surveyor, City Surveyor's Office, Truro.

MARCH 23.—**Whitby.**—STONE.—Tenders are invited for the quarrying or breaking of stones, the carting on to the highways of the same from any appointed quarry or station, and the laying on stones. Forms of tender and further particulars may be obtained of Mr. John Lyth, District Surveyor, Whitby.

MARCH 24. — **Little Woolton.** — MACADAM.—The U.D.C. of Little Woolton invite tenders for the supply of (1) 2-in. machine-broken granite macadam, and (2) granite chippings. Further particulars, etc., may be obtained from the Surveyor, Mr. R. Simmons, Grange-lane, Gateacre, near Liverpool.

MARCH 24.—**Malling.**—MATERIALS.—Malling R.D.C. invite tenders for materials, team labour, steam rolling, and workmen's tools. Full particulars, etc., may be obtained upon application to Mr. John Marshall, Surveyor, West Malling.

MARCH 24. — **Malling.**—ROAD MATERIALS.—Malling R.D.C. invite tenders for 1,700 cubic yds. of quartzite, basalt, or granite. Full particulars, etc., may be obtained from Mr. John Marshall, Surveyor, West Malling.

MARCH 24. — **Mountain Ash.** — MATERIALS. — Mountain Ash U.D.C. invite tenders for the supply of ironmongery, hardware goods, paints, cement, etc. Forms of tender may be obtained from Mr. W. G. Thomas, Surveyor, Town Hall, Mountain Ash.

MARCH 24. — **Mountain Ash.**—ROAD MATERIAL.—Mountain Ash U.D.C. invite tenders for:—(1) Supply of broken mountain limestone and gravel; (2) supply of broken native stone; (3) filling and hauling of broken mountain limestone. Specifications may be seen, and forms of tender obtained, on application to Mr. W. G. Thomas, Surveyor, Town Hall, Mountain Ash.

MARCH 25. — **Hallaton.** — MATERIALS. — Hallaton R.D.C. invite tenders for the supply of broken granite, etc. No forms of tender Mr. Jas. H. Douglass, Clerk, Market Harborough.

MARCH 25. — **Hartismere.**—GRANITE, ETC.—Hartismere R.D.C. invite tenders for the supply of about 2,100 tons of granite or quartzite and 2,500 tons of pit stones. Mr. Harold Warnes, Solicitor, Clerk to the Council, Eye, Suffolk.

MARCH 25. — **Market Bosworth.**—GRANITE.—The R.D.C. invite tenders for the supply of broken granite. Forms of tender can be obtained from Mr. Frank Bouskell, Clerk to the Council, Market Bosworth, Nuneaton, or Mr. J. Thorpe, Highway Surveyor.

MARCH 25.—**Morley.**—ANNUAL TENDERS.—The Corporation of Morley invite tenders for the supply of materials. Forms of tender may be obtained on application to Mr. W. E. Putman, A.M.Inst.C.E., Borough Engineer and Surveyor, Town Hall, Morley.

MARCH 25.—**Norden.**—FLAGS, SETTS, ETC.—Norden U.D.C. invite tenders for the supply of flags, setts, kerb, and macadam. Full particulars may be obtained on application to the Surveyor, Council Offices, Norden.

MARCH 25. — **Otley.** — MATERIALS.—The U.D.C. of Otley invite tenders for the supply of pitch, tar, and creosote oil, granite, macadam, limestone macadam, setts, kerbs, etc. Specifications, etc., may be obtained from Mr. J. E. Sharpe, Engineer and Surveyor to the Council, Council Offices, Otley.

MARCH 26.—**Chatham.**—MATERIALS.—The T.C. invite tenders for 2,880 tons 2½-in. broken granite or other hard stone for macadam; 2,250 cubic yds. 2½-in. surface-picked flints; 250 tons Inverkeithing granite setts. Specification, etc., can be obtained on application at the Borough Surveyor's Office, Town Hall, Chatham.

MARCH 26.—**Hackney.**—OILS.—Hackney B.C. invite tenders for the supply and delivery at their Electricity Works, Millfields-road, Clapton, N.E., of lubricating oils. Specification, etc., may be had on application to Mr. W. A. Williams, Town Clerk, Town Hall, Mare-street, Hackney, on deposit of 1l.

MARCH 26.—**Romford.**—MATERIALS.—The Romford U.D.C. invite tenders for the supply of about 1,040 tons of best blue Guernsey granite. Forms of tender can be obtained on application to either Mr. J. Turvey, the Surveyor, or Mr. Charles T. King, Clerk, Council Offices, Romford.

MARCH 27. — **Ormskirk.** — ANNUAL CONTRACTS.—Ormskirk U.D.C. invite tenders for the supply and delivery of materials. Specification, etc., may be obtained upon application to Mr. Hugh W. Chadwick, Surveyor, Council Offices, Ormskirk.

MARCH 28. — **Pocklington.** — STONE.—Pocklington R.D.C. invite tenders for the supply of best blue stone and slag for repairing the roads. Forms of tender can be obtained from Mr. Thomas Robson, Clerk, Pocklington.

MARCH 28. — **Waterloo.** — STORES.—The U.D.C. of Waterloo-with-Seaforth invite tenders for the supply of materials, stores, etc. Specifications, etc., may be obtained, on application, from Mr. F. Spencer Yates, A.M.Inst.C.E., the Surveyor to the Council, at the Town Hall, Waterloo.

MARCH 30. — **Molesey.** — ANNUAL CONTRACTS.—The U.D.C. of East and West Molesey invite tenders for the supply and delivery of Portland cement, Quenast granite, Kentish brown flints, Hungry Hill flints, Farnham fine gravel, etc. Specifications, etc., may be obtained upon application to the Surveyor, D.C. Office, East Molesey.

MARCH 30. — **Sheffield.** — MATERIALS. — Sheffield Watch Committee invite tenders for tinned copper, copper tube, lead and iron pipe, oil, paint, etc. Particulars, etc., may be obtained, and samples inspected, on application at the office of the Chief Constable, Castle Green, on payment of the sum of 10s

MARCH 30. — **Teddington.** — MATERIALS.—Teddington U.D.C. invite tenders for supply of granite, flints, ballast, team labour, etc. Specifications, etc., may be obtained on application to Mr. Marshall Hainsworth, Surveyor, Council Offices, Teddington.

MARCH 30. — **Tendring.** — FLINTS AND GRANITE.—Tendring R.D.C. invite tenders for the supply of red Kent flints and granite. Tenders must be received by the Surveyor, Mr. J. Bell, of Great Bentley, near Colchester.

MARCH 30. — **Sheffield.** — MATERIALS. — The Watch Committee of the City Council invite tenders for lamp posts and tulips, pillar heads, pipe hooks, bracket nails, iron wedges, copper bottoms for lamps, copper lamps, copper name lamps, lever cocks, taper sockets and plugs, etc. Particulars, etc., may be obtained at the office of the Lighting Superintendent, 42, Corporation-street, Sheffield, on payment of the sum of 10s.

MARCH 30. — **Steyning.** — FLINTS.—Steyning East R.D.C. invite tenders for the supply of flints. Forms of tender can be obtained on application to Mr. Arthur Flowers, Solicitor and Clerk to the Council, Union Offices, New Shoreham, Sussex, or of the Surveyor of the Council, Mr. G. W. Warr, Town Hall, Southwick.

MARCH 31.—**Leeds.**—GOODS.—Leeds Corporation invite tenders for the supply of goods required for the Electric Lighting Department. Schedules, forms of tender, etc., may be had on application to Mr. H. Dickinson, Manager of the Electric Lighting Department, 1, Whitehall-road, Leeds.

MARCH 31.—**Southwick-on-Wear.**—SUPPLIES.—The U.D.C. invite tenders for the supply of hardware, ironwork, disinfectants, road material for the year ending March 31, 1909. Schedules, etc., may be obtained at the Surveyor's office, Council Offices, Southwick-on-Wear.

APRIL 1.—**Herne Bay.**—ANNUAL CONTRACTS.—Herne Bay U.D.C. invite tenders for materials, etc. Forms of tender, etc., may be had on application to Mr. F. W. J. Palmer, Surveyor to the Council, Town Hall, Herne Bay.

APRIL 4. — **Sandwich.**—MATERIALS.—The Corporation invite tenders for the supply of 450 tons 1½-in. (more or less) broken granite; 175 lin. ft. 6 in. by 12 in. Norway edge kerb. No forms of tender issued. Mr. Alf. J. Firby, Borough Surveyor, Borough Surveyor's Office.

APRIL 4.—**Worsley.**—ANNUAL CONTRACTS.—Worsley U.D.C. invite tenders for the supply of materials. Form of tender and particulars may be obtained on application to the Surveyor, Mr. J. Howard, District Offices, Hilton-lane, Walkden.

APRIL 6. — **Wolverhampton.** — ANNUAL CONTRACTS FOR STORES.—Portland cement, macadam, broken slag, paving and building bricks, brooms, stoneware pipes, etc. Specifications, etc., may be obtained on application at the office of Mr. George Green, Borough Engineer, Town Hall, Wolverhampton.

NO DATE.—**Bath.**—MATERIALS.—The Bath R.D.C. invite tenders for the supply of best basalt, granite, black rock, mountain lime, and other approved hard stone, and the hauling of the same, and for the supply of workmen's tools. Forms of tender may be obtained from Mr. R. H. Whittington, 5, Old King-street, Bath, Clerk to the Council.

NO DATE. — **Bournemouth.**—MATERIALS.—Bournemouth Corporation invite tenders for the twelve months' supply of oils and greases, and of brake blocks. Specification and particulars will be forwarded upon application to Mr. C. Barber, Engineer and Traffic Manager, Tramways Offices, Bournemouth.

NO DATE. — **Broomhill.** — MATERIALS. — Colliery materials, excepting mining timber, oils, and wire ropes. Tender forms on application to Broomhill Collieries, Ltd., Broomhill Colliery, Acklington.

Public Appointments.

Nature of Appointment.	By whom Advertised.	Salary.	Application to be in
*QUANTITY SURVEYOR	Acton U.D.C.	See advertisement in this issue	March 23
*ASSIST. DIVISIONAL OFFICER OF THE LDN. FIRE BDGE.	London County Council	300l., etc.	April 6
*SURVEYORS (3) ECCLESIASTICAL DILAPIDATIONS	Diocese of Oxford	See advertisement in this issue	April 10

Auction Sales.

Nature and Place of Sale.	By whom Offered.	Date of Sale
*BUILDING MATERIALS, MACHINERY AND EFFECTS, SLEAFORD—On the Premises ...	Longstaff & Wadsley	March 13
*WOOD-WORKING MACHINERY, GRAY'S-INN-ROAD, W.C.—On the Premises ...	Frank G. Bowen	March 17
*FREEHOLD ESTATE, EDMONTON—At the Mart ...	David Burnett, Son, & Baddeley	March 18
*161, BROMPTON-ROAD—At the Mart ...	Fox & Bousfield	do.
*BUILDER AND CONTRACTOR'S STOCK AND PLANT, HIGH BARNET—On the Premises ...	H. W. Smith	March 19
*SCAFFOLDING AND TIMBER, BATTERSEA—On the Premises ...	Joseph Hibbard & Sons	March 23
*BUILDER AND CONTRACTOR'S PLANT, CANNING TOWN, E.—On the Premises ...	Fuller, Horsey, Sons, & Cassell	March 24
*FREEHOLD LICENSED PROPERTY, SOHO—At the Mart ...	Farebrother, Ellis, Egerton, Breach, Galsworthy, & Co.	March 26
*FREEHOLD ESTATE, NEW SOUTHGATE—At the Mart ...	Harman Bros.	March 27
*BUILDER'S PLANT, MACHINERY AND STOCK, WOOD-GREEN, N.—On the Premises ...	Fuller, Horsey, Sons, & Cassell	March 31
*FREEHOLD, ETC., WATERSIDE, ETC., PREMISES, LIMEHOUSE—At the Mart ...	Debenham, Tewson, Richardson, & Co.	do.
*FREEHOLD BUILDING LAND, COULSDON—Greyhound Hotel, Croydon ...	Robert W. Fuller, Moon, & Fuller	April 2
*FREEHOLD BUILDING SITE, ANGEL-COURT—At the Mart ...	Daniel Watney & Sons	April 3
*FREEHOLD BUILDING SITE, SMITHFIELD—At the Mart ...	Daniel Watney & Sons	do.
*BUILDING ESTATE, MAYFAIR, W.—At the Mart ...	Winkworth & Co.	April 8
*BUILDING LEASE, OLD BROAD-STREET, THROGMORTON-STREET—At the Mart ...	Fox & Bousfield	do.
*FREEHOLD PROPERTY, ENFIELD—At the Mart ...	Walton & Lee	May 5
*BUILDING ESTATE, HARROW-ON-THE-HILL—At the Mart ...	Walton & Lee	May 19
*FREEHOLD BUILDING LAND, VICTORIA AND ROYAL ALBERT DOCKS—At the Mart ...	Baxter, Payne, & Lepper	No date

PATENTS.—*Continued from page 316.*

fulcrum, and operated by a connecting rod or the equivalent provided with a relief spring or relief springs, and operated by a cam worked by any suitable shaft of the machine.

11,691 of 1907.—W. P. GIBSON: *Partitions or Interlocking Tiles or Slabs.*

This relates to interlocking tiles or slabs formed of plates from which rise bosses, such bosses and the edges of the plates being provided with inclines at the same angle adapted to engage with corresponding inclines on the reverse face of slab or tile and boss of similar construction.

12,111 of 1907.—EVERED & Co., LTD., and G. CLARKE: *Casement Stays.*

This relates to a casement stay, comprising inner and outer telescopic members of rectangular transverse section, in combination with an affixing screw which is mounted upon the inner member.

13,850 of 1907.—W. H. HASLAM: *Grates for Domestic Fireplaces.*

This relates to grates for domestic fireplaces, especially of the class in which the firegrates are mounted below or approximately level with the hearths, and wherein said grates are mounted on supports which allow them to be movable, comprising metal framework or a base-piece somewhat of rectangular shape which is formed so that it may be built into the brickwork of the fireplace. From this rectangular base-plate projecting pieces extend vertically, so that lateral projections from the back pair of such projecting pieces may extend to support arms or extensions on the back of the firegrate which reach over and rest upon them in the front pair of vertical projections, rack-teeth or like recesses or projections are formed to receive and support projecting studs adjustably secured to the firegrates at the sides near the front thereof, thus said firegrates can have their front edges raised or lowered and held in such positions.

22,689 of 1907.—D. P. KAHLE: *Gripping Devices for Wrenches.*

This relates to a gripping device for wrenches, comprising a threaded shank, a fixed and a movable jaw, a revoluble sleeve connected with said movable jaw, controllable locking washers movably mounted on said sleeves, and having threads to engage the threads of said shank, the arrangement whereby a retaining member is interposed between said washers, and means carried by said washers and engaged by said member to normally maintain said washers out of alignment with each other, and in threaded engagement with said shank.

13,611 of 1907.—THE ASSOCIATED PORTLAND CEMENT MANUFACTURERS (1900), LTD., and G. W. BUTCHARD: *Manufacture of Concrete.*

This relates to concrete made of cement or lime with an aggregate consisting of broken burnt gault. It is prepared by drying and calcining pieces of gault of a suitable size in a kiln of suitable type, or by calcining pieces of similar size in open stacks or piles; the material when burnt is properly selected by the exclusion of any underburnt portions, and is then crushed to any desired size for use on the work. It is then mixed with water in a concrete mixer, or in any other usual mode with finely ground Portland cement of good quality in such proportions as the nature of the work requires. Concrete may also be made by substituting lime for cement, and sand may be added to the mixture in both cases. The burnt gault, however, can be graded so that no further addition of sand or small material is necessary to fill interstices and produce a homogeneous mass of concrete.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

February 28.—By BENJAFIELD & WOOD (at Lincoln).

Lincoln.—15, Cambridge-av., f., c.r. 26*l.* £465

March 2.—By CHANCELLOR & SONS.

Richmond.—5 and 6, Dunstable-villas, u.t. 72 yrs., g.r. 6*l.* 6s., y. and w.r. 54*l.* 2s. 300

By ALFRED SAVILL & SONS.

Barking, Essex.—5, Broadway (s.), f., c.r. 65*l.* .. 1,020
Harold Wood.—Squirrel's Heath-rd., Jubilee cottages, f., w.r. 59*l.* 16s. 700

By WEATHERALL & GREEN.

Catford.—Nelgarde-rd., f.g. rents 58*l.* 10s., reversion in 90 yrs. 1,320
Bradgate-rd., f.g.r. 4*l.* 10s., reversion in 90 yrs. 110

By WHEELER BROS.

Chelsea.—4, Glebe-pl., u.t. 59½ yrs., g.r. 7*l.*, c.r. 60*l.* 540
Battersea.—7, Albert Bridge-rd., u.t. 69½ yrs., g.r. 10*l.*, y.r. 45*l.* 455

March 3.—By FRANCIS DOD & CO.

Islington.—113 and 115, Barnsbury-rd., f., y.r. 84*l.* 925
Hackney.—71, Amhurst-rd., u.t. 51 yrs., g.r. 7*l.* 7s., y.r. 42*l.* 350
Ashford, Middlesex.—"West View," Fairholme-rd., and six plots adjoining, f., y.r. 26*l.* 465
Leyton.—24 to 30 (even), Malta-rd., u.t. 80 yrs., g.r. 16*l.* 8s., w.r. 93*l.* 12s. 580

By HAMILTON'S.

Hendon.—6 to 14 (even), Audley-rd., u.t. 95 yrs., g.r. 32*l.* 10s., y.r. 160*l.* 1,300

By J. G. SAXTON.

Peckham.—66, Nutcroft-rd., u.t. 66, yrs., g.r. 4*l.* 15s., c.r. 44*l.* 4s. 285

By G. B. HILLIARD & SON (at Brentwood).

Brentwood, Essex.—High-st., "The George and Dragon," area 5,000 ft., f. 1,550

By COBB (at Rochester).

Cobham, Kent.—Danes-pl., 3 a. 0 r. 21., f. 810

March 4.—By LEOPOLD FARMER & SONS.

Kentish Town.—24 and 26, Spencer-rd., f., w.r. 117*l.* 12s. 700

By FREEMANTLE & FOX.

Hyde Park.—5, Seymour-pl. (s.), and stabling, u.t. 20 yrs., g.r. 30*l.*, y.r. 160*l.* 900

By DOUGLAS YOUNG & CO.

Brockley.—73, Endwell-rd., u.t. 66 yrs., g.r. 5*l.* 5s., c.r. 34*l.* 225
Clapham.—Clarence-road., three freehold building sites 980
Norwood.—82, Denmark-rd., f., c.r. 28*l.* 285

March 5.—By W. W. JENKINSON & Co.

Old Kent-Road.—Trafalgar-rd., f.g.r. 16*l.*, reversion in 8 yrs. 755
Trafalgar-rd., f.g.r. 14*l.* 17s., reversion in 16 yrs. 715
Trafalgar-rd., f.g.r. 20*l.* 5s. 6d., reversion in 33 yrs. 740
Trafalgar-rd., f.g.r. 200*l.*, reversion in 64 yrs. 4,700
"The Oxford Arms," f.g.r. 85*l.*, reversion in 64 yrs. 2,320
"The Lord Wellington Hotel," f.g.r. 105*l.*, reversion in 64 yrs. 2,250
Malt-st., f.g.r. 55*l.*, reversion in 21 yrs. 2,400
Ossory-rd., f.g.r. 20*l.*, reversion in 21 yrs. 2,100
Malt-st., f.g.r. 5*l.*, reversion in 21 yrs. 795
Ossory-rd., f.g.r. 20*l.*, reversion in 21 yrs. 2,250

By C. C. & T. MOORE.

Mile End.—24, Burdett-rd., also l.g. rents 15*l.* 10s., u.t. 39¾ yrs., g.r. 14*l.* 290
Minories.—64 and 65, Chamber-st., f., w.r. 80*l.* 12s. 600
Bethnal Green.—34, Allas-rd., u.t. 57½ yrs., g.r. 4*l.* 4s., w.r. 33*l.* 16s. 200
London Fields.—4, 6, and 8, The Broadway; 4 to 12 (even), Ada-st., u.t. 23 yrs., g.r. nil, w.r. 242*l.* 930
3 and 4, Andrews-rd.; 20 and 22, Ada-st., u.t. 23 yrs., g.r. 14*l.*, w.r. 139*l.* 535

By NEWBON, SHEPHARD, & EDWARDS.

Chelsea.—28 and 29, Markham-st., u.t. 11¼ yrs., g.r. 1*l.* 15s., c.r. 38*l.* 110
Stoke Newington.—1, Norcott-rd., u.t. 70 yrs., g.r. 7*l.*, y.r. 38*l.* 375
30, Benthal-rd., u.t. 68 yrs., g.r. 8*l.*, y.r. 48*l.* .. 390
Canonbury.—11, Grange-rd., u.t. 28¼ yrs., g.r. 6*l.* 8s., y.r. 55*l.* 275
Holloway.—63, Cheverton-rd., u.t. 80 yrs., g.r. 7*l.*, c.r. 36*l.* 380
Victoria Park.—1, 3, 5, 7, and 9, Prince Edward-rd., u.t. 64 yrs., g.r. 15*l.*, w.r. 104*l.* 200

PHIBBS GIBSON & CO.

Herne Hill.—24, Deerbrook-rd., u.t. 55, yrs., g.r. 7*l.*, c.r. 42*l.* £310

GRIMLEY & SON (at Birmingham).

Coleshill, Warwick.—Blyth-rd., "The Grand Turk," f. 280
Tyseley, Warwick.—Warwick-rd., Stoneleigh House, f.p. 695
Birchfield, Staffs.—Canterbury-rd., etc., freehold building land, 25p. 1,447

By PERKINS & SONS (at Southampton).

Millbrook, Hants.—Walnut-gr., two residences, two cottages, etc., 5 acres, u.t. 53 yrs., Quit rent 10s., w.r. 74*l.* 480

March 6.—By MARTEN & CARNABY.

Dulwich.—8, Acacia-gr., u.t. 41 yrs., g.r. 3*l.*, c.r. 36*l.* 315
Merton.—Devonshire-rd., Holmwood, f., c.r. 26*l.* 275

By OGDEN, SONS, & OLLEY.

Wimbledon.—Clifton-rd., freehold building site 960

By FRED VARLEY & SON.

Finsbury Park.—38, Wilberforce-rd., u.t. 59 yrs., g.r. 8*l.*, c.r. 50*l.* 420
Leytonstone.—134, Hainault, f., c.r. 48*l.* 550

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; p. for possession; e.r. for estimated rental; w.r. for weekly rental; q.r. for quarterly rental; y.r. for yearly rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; la. for lane; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; av. for avenue; gdns. for gardens; yd. for yard; gr. for grove; b.h. for beerhouse; p.h. for public-house; o. for office; s. for shops; ct. for court.

PUBLISHER'S NOTICES.

Nat. Tel., 6112 Gerrard. Telegrams, "The Builder, London."

THE INDEX (with TITLE-PAGE) for VOLUME XCIII. (July to December, 1907) was given as a supplement with the Number for January 11, 1908.

CLOTH CASES for Binding the Numbers are now ready, price 2s. 6d. each; also

READING CASES (Cloth), with Strings price 1s. each,

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*** Stamps must not be sent, but all sums should be remitted by Postal Orders, payable to J. MORGAN, and addressed to the Publisher of "THE BUILDER," 4, Catharine Street, W.C.

Advertisements for the current week's issue are received up to ONE p.m. on THURSDAY, but "Classification" is impossible in the case of any which may reach the Office after TWELVE NOON on that day. Those intended for the Outside Wrapper should be in by TWELVE NOON on WEDNESDAY.

ALTERATIONS IN STANDING ADVERTISEMENTS or ORDERS TO DISCONTINUE same must reach the Office before TEN o'clock on WEDNESDAY MORNING.

The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, etc., left at the Office in reply to advertisements, and strongly recommends that of the latter COPIES ONLY should be sent.

ADVERTISERS in "THE BUILDER" may have *Replies addressed to the* OFFICE, 4, CATHERINE ST., STRAND, W.C., *free of charge.* Letters will be forwarded if addressed envelopes are sent, together with sufficient stamps to cover the postage. Unused stamps are returned to advertisers the week after publication.

N.B.—The Reply Boxes are not intended for trade lists, circulars, and the like; should these be received, they cannot (if noticed) be forwarded.

AN EDITION Printed on THIN PAPER, for FOREIGN and COLONIAL CIRCULATION, is issued every week.

READING CASES { ONEPENCE EACH. By post (carefully packed) 1s.

MEETINGS.

FRIDAY, MARCH 13.

Glasgow Architectural Craftsmen's Society.—Mr. Thomas Fraser on "Domestic Hot-Water Supply." 8 p.m.

SATURDAY, MARCH 14.

Royal Institution. — Professor John Thomson on "Electric Discharges through Gases." 3 p.m.

Architectural Association.—Visit to the London, Edinburgh, and Glasgow Assurance Building, Euston-square, Euston-road, N.W. 2.30 p.m.

MONDAY, MARCH 16.

Royal Institute of British Architects.—Mr. Hippolyte J. Blanc, R.S.A., on "A Modern Asylum: Bangour Village, near Edinburgh." 8 p.m.

Institute of Sanitary Engineers.—Mr. J. Freebairn Stow on "A Description of the Several Sewage Disposal Works in the Uxbridge District." 8 p.m.

University of London (South Kensington).—Mr. Banister Fletcher on "German Romanesque Architecture." 8 p.m.

Royal Society of Arts (Cantor Lecture). — Professor Vivian B. Lewes on "Fuel and its Future."—II. 8 p.m.

TUESDAY, MARCH 17.

Institution of Civil Engineers.—Discussion on Mr. W. Barclay Parsons' paper on "The New York Rapid Transit Subway." 8 p.m.

WEDNESDAY, MARCH 18.

Royal Society of Arts.—Fifteenth ordinary meeting. Mr. Wynford Dewhurst, R.B.A., on "Impressionist Painting: Its Genesis and Development." 8 p.m.

THURSDAY, MARCH 19.

London Institution.—Mr. F. Hovenden, F.L.S., F.G.S., on "A Study of the Principles of Nature."—III. 5 p.m.

Royal Institution.—Mr. R. T. Glazebrook, M.A., D.Sc., on "Standardisation on Various Aspects. I.—Mechanical Engineering." 3 p.m.

Carpenters' Hall, London-wall.—Professor W. Somerville, M.A., D.Sc., on "Trees—New and Old." 8 p.m.

Architectural Association Camera and Cycling Club.—Mr. E. Gunn on "Timber, Brick, and Plaster in the Eastern Counties." 7.30 p.m.

Institution of Electrical Engineers.—Dr. W. E. Sumpner and Mr. J. W. Record on "New Alternate Current Instruments." 8 p.m.

Royal Society of Arts (Howard Lecture).—Mr. H. S. Hele-Shaw, LL.D., F.R.S., on "The Navigation of the Air."—I. 8 p.m.

FRIDAY, MARCH 20.

Architectural Association.—Paper by Mr. H. Tanner, jun., entitled "Some Notes on Domestic Work of the Renaissance in England." 7.30 p.m.

Royal Institution.—Professor A. E. H. Love, M.A., D.S., on "The Figure and Constitution of the Earth." 9 p.m.

Institution of Civil Engineers (Students' Meeting).—Mr. J. D. W. Ball on "Stresses in Brick Arches." 8 p.m

SATURDAY, MARCH 21.

Royal Institution.—Professor J. J. Thomson, M.A., D.Sc., on "Electric Discharges through Gases."—III. 3 p.m.

Architectural Association.—Visit to the Associated Portland Cement Manufacturers, Ltd., Works, Swanscombe-on-Thames. 9.30 a.m.

Edinburgh Architectural Association.—Visits (1) to St. Peter's Church, Falcon-avenue; (2) Private Oratory of the Archbishop, Greenhill-gardens.

Institute of Sanitary Engineers.—Visit to Sewage Disposal Works of the Joint Drainage Scheme, Cowley, Middlesex.

Junior Institution of Engineers.—Reception at Caxton Hall, Westminster. 6.30 p.m.

PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	£ s. d.	
Stocks	1 6 0	per 1000 alongside, in river.
Red Stocks for facings	2 10 0	" delivered.
Flettons	1 5 0	" at railway depot.
Red Wire Cuts	1 14 0	" " "
Best Fareham Red	3 12 0	" " "
Best Red Pressed Ruabon Facing	5 0 0	" " "
Best Blue Pressed Staffordshire	3 15 0	" " "
Do. Bullnose	4 0 0	" " "
Best Stourbridge Fire Bricks	3 14 0	" " "
GLAZED BRICKS.		
Best White and Ivory Glazed Stretchers	9 0 0	" " "
Headers	8 5 0	" " "
Quoins, Bullnose, and Flats	12 10 0	" " "
Double Stretchers	14 15 0	" " "
Double Headers	12 10 0	" " "
One Side and two Ends	14 15 0	" " "
Two Sides and one End	15 10 0	" " "
Splays, Chamferred, Squints	15 10 0	" " "

	s. d.	
Thames and Pit Sand	6 6	per yard, delivered.
Thames Ballast	5 0	" "
Best Portland Cement	30 0	per ton, "
Best Ground Blue Lias Lime	19 6	" "

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime ..... 11s. 6d. per yard, delivered.
Stourbridge Fireclay in sacks 27s. 0d. per ton at rly. dpt.

STONE.

BATH STONE—delivered on road waggons, Paddington Depôt	s. d.	
	1 6¼	per ft. cube.
Do. do. delivered on road waggons, Nine Elms Depôt	1 8¼	" "

STONE (*continued*).

PORTLAND STONE (20 ft. average)—	s. d.	
Brown Whitbed, delivered on road waggons, Paddington Depôt, Nine Elms Depôt, or Pimlico Depôt, or Pimlico Wharf	2 1	per ft. cube
White Basebed, delivered on road waggons, Paddington Depôt, Nine Elms Depôt, or Pimlico Wharf	2 2¼	" "

	s. d.	
Ancaster in blocks	1 10	per ft. cube, deld. rly. depôt.
Beer "	1 6	" "
Greenshill "	1 10	" "
Darley Dale in blocks	2 4	" "
Red Corsehill "	2 2	" "
Closeburn Red Freestone	2 0	" "
Red Mansfield "	2 4	" "

YORK STONE—*Robin Hood Quality.*

	s. d.	
Scappled random blocks	2 10	" "
6 in. sawn two sides landings to sizes (under 40 ft. super.)	2 3	per ft. super., "
6 in. rubbed two sides ditto, ditto	2 6	" "
3 in. sawn two sides slabs (random sizes)	0 11½	per ft. cube, "
2 in. to 2½ in. sawn one side slabs (random sizes)	0 7½	" "
1½ in. to 2 in. ditto, ditto	0 6	" "
HARD YORK—		
Scappled random blocks	3 0	" "
6 in. sawn two sides landings to sizes (under 40 ft. super.)	2 8	per ft. super. "
6 in. rubbed two sides ditto	3 0	" "
3 in. sawn two sides slabs (random sizes)	1 2	" "
2 in. self-faced random flags	0 5	" "

SLATES.

In. In.	£ s. d.	
20×10 best blue Bangor	13 2 6	per 1000 of 1200 at r. d.
20×12 " "	13 17 6	" "
20×10 first quality,,	13 0 0	" "
20×12 " "	13 15 0	" "
16×8 " "	7 5 0	" "
20×10 best blue Portmadoc	12 12 6	" "
16×8 " "	6 12 6	" "
20×10 best Eureka unfading green	15 17 6	" "
20×12 " "	18 7 6	" "
18×10 " "	13 5 0	" "
16×8 " "	10 5 0	" "
20×10 permanent green	11 12 6	" "
18×10 " "	9 12 6	" "
16×8 " "	6 12 6	" "

TILES.

	s. d.	
Best plain red roofing tiles	42	0 per 1000 at rly. depôt.
Hip and Valley tiles	3	7 per doz. "
Best Broseley tiles	50	0 per 1000 "
Do. Ornamental tiles	52	6 " "
Hip and Valley tiles	4	0 per doz. "
Best Ruabon red, brown, or brindled do. (Edward-)	57	6 per 1000 "
Do. Ornamental do.	60	0 " "
Hip tiles	4	0 per doz. "
Valley tiles	3	0 " "
Best Red or Mottled Staffordshire do. (Peakes)	51	9 per 1000 "
Do. Ornamental do.	54	6 " "
Hip tiles	4	1 per doz. "
Valley tiles	3	8 " "
Best "Rosemary" brand plain tiles	48	0 per 1000 "
Best Ornamental tiles	50	0 " "
Hip tiles	4	0 per doz. "
Valley tiles	3	8 " "
Best "Hartshill" brand plain tiles, sand-faced	50	0 per 1000 "
Do. pressed	47	6 " "
Do. Ornamental do.	50	0 " "
Hip tiles	4	0 per doz. "
Valley tiles	3	6 " "

WOOD.

BUILDING WOOD.	At per standard. £ s. d.		£ s. d.
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.	13 10 0	...	15 0 0
Deals: best 3 by 9	13 0 0	...	14 0 0
Battens: best 2½ in. by 7 in. and 8 in., and 3 in. by 7 in. and 8 in.	11 0 0	...	12 0 0
Battens: best 2½ by 6 and 3 by 6	0 10 0	less than 7 in. and 8 in.	
Deals: seconds	1 0 0	less than best.	
Battens: seconds	0 10 0	" "	
2 in. by 4 in. and 3 in. by 6 in.	9 0 0	...	10 0 0
2 in. by 4½ in. and 2 in. by 5 in.	8 10 0	...	9 10 0
Foreign Sawn Boards—			
1 in. and 1¼ in. by 7 in.	0 10 0	more than battens.	
¾ in.	1 0 0	"	
Fir timber: best middling Danzig or Memel (average specification)	At per load of 50 ft. 4 10 0	...	5 0 0
Seconds	4 0 0	...	4 10 0
Small timber (8 in. to 10 in.)	3 12 6	...	3 15 0
Small timber (6 in. to 8 in.)	3 0 0	...	3 10 0
Swedish balks	2 10 0	...	3 0 0
Pitch-pine timber (30 ft. average)	4 0 0	...	4 15 0

JOINERS' WOOD.	At per standard. £ s. d.		£ s. d.
White Sea: first yellow deals, 3 in. by 11 in.	24 0 0	...	25 0 0
3 in. by 9 in.	22 0 0	...	23 0 0
Battens, 2½ in. and 3 in. by 7 in.	16 10 0	...	18 0 0
Second yellow deals, 3 in. by 11 in.	18 10 0	...	20 0 0
" " 3 in. by 9 in.	17 10 0	...	19 0 0
Battens, 2½ in. and 3 in. by 7 in.	13 10 0	...	14 10 0
Third yellow deals, 3 in. by 11 in. and 9 in.	13 10 0	...	15 0 0
Battens, 2½ in. and 3 in. by 7 in.	11 0 0	...	12 0 0

WOOD (*continued*).

JOINERS' WOOD (*continued*)—	At per standard. £ s. d.		£ s. d.
Petersburg first yellow deals, 3 in. by 11 in.	21 0 0	...	22 10 0
Do. 3 in. by 9 in.	18 0 0	...	19 10 0
Battens	13 10 0	...	15 0 0
Second yellow deals, 3in. by 11in.	16 0 0	...	17 0 0
Do. 3 in. by 9 in.	14 10 0	...	16 0 0
Battens	11 0 0	...	12 10 0
Third yellow deals, 3 in. by 11 in.	13 0 0	...	14 0 0
Do. 3 in. by 9 in.	12 10 0	...	14 0 0
Battens	10 0 0	...	11 0 0
White Sea and Petersburg—			
First white deals, 3 in. by 11 in.	14 10 0	...	15 10 0
" " 3 in. by 9 in.	13 10 0	...	14 10 0
Battens	11 0 0	...	12 0 0
Second white deals, 3in. by 11 in.	13 10 0	...	14 10 0
" " 3 in. by 9 in.	12 10 0	...	13 10 0
" " battens	10 0 0	...	11 0 0
Pitch-pine: deals	18 0 0	...	21 0 0
Under 2 in. thick extra	0 10 0	...	1 0 0
Yellow pine—First, regular sizes	44 0 0	upwards.	
Oddments	32 0 0	"	
Seconds, regular sizes	33 0 0	"	
Yellow Pine oddments	28 0 0	"	
Kauri Pine—Planks, per ft. cube	0 3 6	...	0 5 0
Danzig and Stettin Oak Logs—			
Large, per ft. cube	0 3 0	...	0 3 6
Small " "	0 2 6	...	0 2 9
Wainscot Oak Logs, per ft. cube	0 5 6	...	0 6 0
Dry Wainscot Oak, per ft. sup. as inch	0 0 8½	...	0 0 9½
¾ in. do. do.	0 0 7	...	—
Dry Mahogany—Honduras, Tabasco, per ft. super. as inch	0 0 9	...	0 1 0
Selected, Figury, per ft. super. as inch	0 1 6	...	0 2 6
Dry Walnut, American, per ft. super. as inch	0 0 10	...	0 1 0
Teak, per load	17 0 0	...	22 0 0
American Whitewood Planks, per ft. cube	0 4 0	...	0 5 0
Prepared Flooring, etc.—	Per square.		
1 in. by 7 in. yellow, planed and shot	0 13 6	...	0 17 0
1 in. by 7 in. yellow, planed and matched	0 14 0	...	0 18 0
1¼ in. by 7 in. yellow, planed and matched	0 16 0	...	1 0 0
1 in. by 7 in. white, planed and shot	0 12 0	...	0 14 6
1 in. by 7 in. white, planed and matched	0 12 6	...	0 15 0
1¼ in. by 7 in. white, planed and matched	0 15 0	...	0 16 6
¾ in. by 7 in. yellow, matched and beaded or V-jointed brds.	0 11 0	...	0 13 6
1 in. by 7 in. " "	0 14 0	...	0 18 0
¾ in. by 7 in. white " "	0 10 0	...	0 11 6
1 in. by 7 in. " "	0 12 9	...	0 15 0

6 in. at 6d. to 9d. per square less than 7 in.

JOISTS, GIRDERS, &c.

	In London, or delivered Railway Vans, per ton. £ s. d.		£ s. d.
Rolled Steel Joists, ordinary sections	7 10 0	...	8 0 0
Compound Girders, ordinary sections	9 10 0	...	10 10 0
Steel Compound Stanchions	12 0 0	...	13 0 0
Angles, Tees, and Channels, ordinary sections	9 10 0	...	10 10 0
Flitch Plates	9 10 0	...	10 0 0
Cast Iron Columns and Stanchions including ordinary patterns	8 0 0	...	9 0 0

METALS.

	Per ton, in London. £ s. d.		£ s. d.
IRON—			
Common Bars	8 10 0	...	9 0 0
Staffordshire Crown Bars, good merchant quality	8 15 0	...	9 5 0
Staffordshire "Marked Bars"	10 10 0	...	—
Mild Steel Bars	8 15 0	...	9 5 0
Hoop Iron, basis price	9 5 0	...	9 10 0
" " Galvanised	17 0 0	...	—
(*And upwards, according to size and gauge.)			
Sheet Iron Black—			
Ordinary sizes to 20 g.	9 15 0	...	—
" " 24 g.	10 15 0	...	—
" " 26 g.	12 5 0	...	—
Sheet Iron, Galvanised, flat, ordinary quality—			
Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g.	15 0 0	...	—
Ordinary sizes to 22 g. and 24 g.	15 10 0	...	—
" " 26 g.	16 10 0	...	—
Sheet Iron, Galvanised, flat, best quality—			
Ordinary sizes to 20 g.	18 0 0	...	—
" " 22 g. and 24 g.	18 10 0	...	—
" " 26 g.	20 0 0	...	—
Galvanised Corrugated Sheets—			
Ordinary sizes, 6 ft. to 8 ft. 20 g.	14 10 0	...	—
" " 22 g. and 24 g.	14 15 0	...	—
" " 26 g.	16 5 0	...	—
Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. by 20 g. and thicker	12 0 0	...	—
Best Soft Steel Sheets, 22 g. & 24 g.	13 0 0	...	—
" " " 26 g.	15 0 0	...	—
Cut Nails, 3 in. to 6 in.	10 10 0	...	11 0 0
(Under 3 in., usual trade extras.)			

LEAD, &c.

	Per ton, in London. £ s. d.		£ s. d.
LEAD—Sheet, English, 3lb. and up.	17 0 0	...	—
Pipe in coils	17 10 0	...	—
Soil pipe	20 0 0	...	—
Compo pipe	21 0 0	...	—
ZINC—sheet—			
Vieille Montagne	ton 28 10 0	...	—
Silesian	28 5 0	...	—
COPPER—			
Strong Sheet	per lb. 0 1 1	...	—
Thin "	" 0 1 2	...	—
Copper nails	" 0 0 11	...	—
Copper wire	" 0 0 10	...	—

LEAD, &c. (*continued*).

		£	s.	d.	£	s.	d.
BRASS—							
Strong Sheet	per lb.	0	1	0	...	—	
Thin	"	0	1	1	...	—	
TIN—English Ingots	"	0	1	4	...	—	
SOLDER—Plumbers'	"	0	0	7	...	—	
Tinmen's	"	0	0	9	...	—	
Blowpipe	"	0	0	11	...	—	

ENGLISH SHEET GLASS IN CRATES OF STOCK SIZES.

15 oz. thirds	2½d. per ft. delivered.
" fourths	1¾d. " "
21 oz. thirds	3½d. " "
" fourths	2½d. " "
26 oz. thirds	4½d. " "
" fourths	3½d. " "
32 oz. thirds	5d. " "
" fourths	4½d. " "
Fluted Sheet, 15 oz.	3½d. " "
" 21 oz.	4½d. " "

ENGLISH ROLLED PLATE IN CRATES OF STOCK SIZES.

Hartley's	2½d. per ft. delivered.
"	2½d. " "
"	2½d. " "
Figured and Oxford Rolled "Oceanic" Glass, white	4d. " "
Do. " tinted	5½d. " "

OILS, &c.

		£	s.	d.
Raw Linseed Oil in pipes	per gallon	0	2	1
" " " in barrels	"	0	2	2
" " " in drums	"	0	2	4
Boiled " " in pipes	"	0	2	3
" " " in barrels	"	0	2	4
" " " in drums	"	0	2	6
Turpentine in barrels	"	0	3	2
" in drums	"	0	3	4
Genuine Ground English White Lea	per ton	22	10	0
Red Lead, Dry	"	22	0	0
Best Linseed Oil Putty	per cwt.	0	7	0
Stockholm Tar	per barrel	1	12	0

VARNISHES, &c.

	Per gallon. £ s. d.
Fine Pale Oak Varnish	0 8 0
Pale Copal Oak	0 10 6
Superfine Pale Elastic Oak	0 12 6
Fine Extra Hard Church Oak	0 10 0
Superfine Hard-drying Oak, for seats of Churches	0 14 6
Fine Elastic Carriage	0 12 0
Superfine Pale Elastic Carriage	0 16 0
Fine Pale Maple	0 16 0
Finest Pale Durable Copal	0 18 0
Extra Pale French Oil	1 1 0
Brunswick Black	0 8 0
Berlin Black	0 16 0
Knotting	0 10 9
French and Brush Polish	0 10 6

TO CORRESPONDENTS.

NOTE.—**The responsibility of signed articles, letters, and papers read at meetings rests, of course, with the authors.**

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All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

TENDERS.

Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than* 10 *a.m. on Thursdays*. [N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is stated, nor any list in which the lowest Tender is under 100*l.*, unless in some exceptional cases and for special reasons.]

*Denotes *accepted*. † Denotes *provisionally accepted*.

BURNHAM.—For alterations and additions to fire-station, parish-room, etc., High-street, for the Parish Council. Mr. J. T. Jacka, architect, Britwell-road, Burnham. Quantities by architect:—

R. D. Bowyer	£814 0	A. Chinnells, Cippenham, Burnham‡	£540 0
G. Cooper & Son	726 12		
H. Burfoot & Son	618 0		
Woodhead & Sons	585 0		

‡This tender was accepted, and has since, by an amendment in specification, been reduced to £490 3s.

BUSHEY.—Accepted for private-street improvement in Highfield, Hillside, Grange, and Vale roads, for the Urban District Council. Mr. E. E. Ryder, Surveyor, Park-road, Bushey. Quantities by the Surveyor:—

Grange-road.
G. Jaggard, Bushey £885 7 10

Highfield-road.
G. Jaggard, Bushey 783 2 2

Hillside-road.
G. Jaggard, Bushey 878 6 4

Vale-road.
W. Bailey & Son, Bushey Heath 771 2 9

CALSTOCK.—For erecting new farmhouse, West Harrowbarrow. Mr. Lawrence Scantlebury, architect and surveyor, George-place, Callington:—

C. B. James	£519 0	F. J. Stanbury	£429 0
J. H. Dingle	476 10	N. A. Roskelly	388 0
W. G. Hoskin	474 12	W. J. Martin, Albaston*	368 10
N. Irwin	430 0		

[Plumbing not included. Stone and sand free.]

CARLISLE.—For erecting a Primitive Methodist Church at Warwick Bridge, for the Trustees. Messrs. W. G. Scott & Co., architects and surveyors, 2, Park-lane, Workington:—

J. Hindson, Carlisle*	£169 6 0
J. Hindson, Carlisle*	152 9 0
Ormerod & Son, Carlisle*	91 3 7
W. Forster, Carlisle*	41 0 0
E. H. Steel, Brampton*	22 18 0
J. Hewitson, Carlisle*	21 12 6

CLECKHEATON.—For the erection of three through stacks of retorts on the Hudson Generative principle, and for a dwarf chimney, for the Urban District Council:—
F. C. Sugden & Co., 20, East Parade, Leeds* £472

COX GREEN (near Maidenhead).—For erecting dairy and implement shed for Sir Edward Barry, Bart., J.P., Ockwell's Manor, Braywick. Mr. H. Stanton Webber, F.S.I., architect, 47, Queen-street, Maidenhead:—

W. Walton	£187 10	W. Creed	£164 15
Silver & Sons	178 0	F. Bissley*	164 0
Cooper & Sons	168 0		

EAST HETTON (Durham).—For 174 lineal yds. of pipe sewer, etc., at East Hetton, for the Rural District Council. Mr. G. Gregson, Surveyor, 38, Saddler-street, Durham:—

J. Hope	£100 10 0	H. Nicholson	£78 0 0
J. W. White	84 0 0	J. Carrick	£74 5 6
G. T. Manners	84 0 0	R. Oliver, Durham*	62 18 3

EPSOM.—For 1,000 yds. of 6-in. cast-iron pipes, for the Urban District Council. Mr. W. Vaux Graham, M.Inst.C.E., 5, Queen Anne's Gate, Westminster, S.W.:—
Stanton Ironworks, Nottingham, £5 5s. per ton straight pipes; specials, 9s. 6d. per cwt.

FELTHAM.—For providing and fixing a new Cornish boiler at the Feltham Industrial School, for the London County Council:—
Oldham Boiler Works Co., Ltd., Oldham* £275

FENNY STRATFORD.—For the erection of a new aisle, etc., St. Martin's Church, for the vicar and churchwardens. Mr. J. Chadwick, architect, Bletchley, Bucks. Quantities by architects:—

J. S. Kimberley	£2,411 0	A. Taylor	£2,102 0
A. J. Staines & Co.	2,385 0	T. Hickman	2,080 0
G. Tombs & Sons	2,335 0	H. Smith	2,056 0
Webster & Cannon	2,208 0	T. Tirrell	2,050 0
Wilford Bros.	2,284 10	G. J. Fisher	1,993 0
Bowman Bros.	2,250 0	W. Wade	1,956 0
J. Ayre & Sons	2,242 0	J. Honour & Son, Tring*	1,797 0
C. Watson	2,198 0		

HISTON.—For house, for Mr. S. Chivers. Messrs. Geo. Baines & Son, architects, 5, Clements-inn, Strand, W.C.:—

G. E. Hawes & Son	£2,570 0 0	A. Negus & Sons	£2,272 17 0
W. Saint	2,469 0 0	Jacklin & Co.	2,266 0 0
W. Lawrence & Son	2,379 10 6	Battley Sons & Holness, 21, Old Kentrd., London, S.E.*	2,226 10 0
W. Sindall	2,353 0 0		
Coulson & Lofts	2,293 12 0		

HOUGHTON CONQUEST.—For erecting new council school for the Bedfordshire County Council.—Messrs. Gotch & Saunders, architect, 55, George-street, Luton:—
F. Giddings & Son, St. Ives* £1,952

LETCHWORTH (Herts).—For erection of cottage, for Miss Villiers:—

T. Raban & Sons	£525	Beckley & Turpie	£460
J. S. Launder	516	A. E. Jeffs	410
S. Redhouse & Son	495	A. Ellis-William*	300

LLANDRINDOD WELLS.—For erecting County Buildings at Llandrindod Wells, for the Radnorshire County Council. Mr. R. Wellings Thomas, F.R.I.B.A., architect, Llandrindod Wells:—

Bromage & Evans	£9,750	Treasure & Sons	£8,006
R. Page	8,889	W. H. Thomas	7,999
R. E. Davies	8,756	Stephens, Bastow, & Co., Ltd.	7,845
E. Thomas & Sons	8,651	J. Dallow & Sons	7,845
E. W. Wilks & Sons	8,500	S. A. Bounds	7,789
D. Davies	8,369	L. Morgan	7,630
H. Gough & Sons	8,300	Hughes & Stirling	7,578
W. P. Lewis & Co.	8,234	Turford & Southward, Ludlow*	7,495
D. W. Davies	8,162	J. H. Davies	7,445
H. Lovatt, Ltd.	8,047		
D. Meredith	8,031		

LONDON.—For electric lighting installation, Holloway fire-station, for the London County Council:—

J. O. Grant & Taylor	£220 0	Nursery & Mart	£200 0
Duncan, Watson, & Co.	275 0	W. J. Fryer & Co., Bravington-road Works, Paddington, W.*	185 0
J. Bryden & Sons	256 0		
W. G. Cannon & Sons, Ltd.	248 13		

LONDON.—For track rails and fastenings, for the London County Council:—

Barrow Hæmatite Steel Co., Ltd.	£5,062	1	3
Bolckow, Vaughan, & Co., Ltd.	4,053	11	3
W. Scott, Ltd., Leeds*	3,978	2	6

[The Chief Engineer's estimate comparable with the above tenders is £3,876 2s. 6d.]

LONDON.—For reconstruction of bridges in Caledonian-road, for the London County Council:—

T. W. Pedrette	£10,601	3	6
Pedrette & Co.	10,348	1	8
Motherwell Bridge Co., Ltd.	10,035	7	0
A. Thorne & Sons	9,562	7	6
A. Fasey & Son	8,902	10	10
Heenan & Froude, Ltd.	8,896	12	7
A. Jackman & Son	8,340	0	0
W. Pattinson & Sons, Ltd.	8,231	10	1
D. G. Somerville & Co.	8,114	6	9
Greig & Matthews	7,863	17	4
D. R. Paterson, Ltd.	6,679	7	6
W. Manders	7,615	7	1
Orr, Watt, & Co., Ltd.	7,584	14	0
P. Wilson & Co.	7,497	5	5
Rawkins & Jackson	7,497	0	0
Rowlingsons & Co.	7,355	8	3
J. Westwood & Co., Ltd.	7,152	14	3
W. Muirhead & Co., Ltd.	7,030	10	5
Dick, Kerr, & Co., Ltd., London, E.C.*	6,895	11	2

[The Chief Engineer's estimate comparable with the above tenders is £7,842.]

LONDON.—For sewer work, 1908-9, for the Lambeth Borough Council:—
A. J. Philcox & Co., 17 and 55, Stockwell-road, S.W.—Swedish deals, second quality (marked H * H), at per standard, at £15; Swedish deals, third quality (marked H H H), at per standard, £13 5s.; Swedish deals, fourth quality (marked q H B), at per standard, £12 5s.; poling boards, 3 ft. by 9 in. by 1½ in., per 1,000 boards, £16 10s.; pitch-pine, 4 in. by 4 in., at 2½d. per ft. run.

LONDON.—Improvements at the High-street Mortuary, for the Lambeth Borough Council:—

Greenhill & Markham	£1,837	4	8
F. & G. Foster	1,739	0	0
F. Deacon & Son	1,532	10	0
Hibberd Bros., Ltd.	1,525	0	0
E. J. Price	1,511	0	0
Spencer, Santo & Co., Ltd	1,499	0	0
F. Webster & Son	1,489	0	0
J. Parsons	1,485	0	0
Hyde & Co.	1,482	0	0
G. Parker	1,479	0	0
W. Mill	1,466	0	0
Lapthorne & Co., High-street, Lambeth*	1,443	0	0

LONDON.—Ten-ton roller and scarifier, for the Lambeth Borough Council:—
Aveling & Porter‡ ..... £525.
‡ With an allowance of £129 for old roller.

LONDON.—For heating Broadwater-road School, Wandsworth, for the London County Council:—
Comyn Ching & Co., Ltd.* £323

LONDON.—For 440 yds. of cable for extending feeder cables in the Walworth-road, for the Southwark Borough Council:—

Siemens Bros. & Co., Ltd.	£183	12	0
Western Electric Co.	180	0	0
Callender's Cable & Construction Co., Ltd.	179	5	0
Johnson & Phillips, Ltd.	178	6	0
The British Insulated & Helsby Cables, Ltd.	176	2	0
The Union Cable Co., Ltd.*	142	16	6

LYMINGTON.—For erecting a house in Belmore, for Major Leathley Armitage. Mr. J. Bevir, architect, 35 and 36, St. Thomas's-street, Lymington:—

Jenkins	£1,788	Rashley	£1,543
G. Walker	1,700	Preston, Lymington*	1,475
Cole & Hackwell	1,963		
Elgar	1,650		

MARCH.—For new County Buildings, March, Cambs, for the Isle of Ely County Council. Mr. Herbert J. Green, A.R.I.B.A., Architect and Diocesan Surveyor, 31, Castle Meadow, Norwich, and at Paradise-chambers, King's Lynn:—

J. G. Oswell	£5,400	0	0
J. Youngs & Son	5,375	0	0
J. W. Wilkinson	5,193	19	3
Guttridge & Sons	5,100	0	0
T. Hickman	5,086	3	4
Rands & Son	5,028	16	0
F. Giddings	4,999	0	0
Elworthy & Co.	4,995	0	0
Thackray & Co.	4,980	0	0
Maxey & Son	4,900	0	0
Brown & Son	4,821	0	0
Whye & Son	4,726	0	6
J. Cracknell	4,707	0	0
C. Redhead	4,696	16	2
Hackaley Bros.	4,689	18	6
A. Christmas	4,663	16	10
G. W. Heath	4,685	4	6
Clarke & Sons	4,525	14	0
R. Shanks, Chatteris‡	4,295	0	0

‡ Accepted conditionally.

MINSTER.—For drainage works and conversion of earth-closets into water-closets for portion of Workhouse and for rain-water tank works, for the Isle of Thanet Guardians. Mr. G. L. Butterworth, Surveyor, Birchington:—

G. Browning	£570	0	0
A. Ross & Co.	574	0	0
G. H. Pettman & Co.	566	0	0
A. Ovenden	566	0	0
W. Wilson	493	0	0
J. Knight	485	0	0
J. Fright	£459	10	0
Paramore, Ltd.	458	0	0
Ballard & Co.	447	17	6
A. E. Goodbourne	411	0	0
J. Newby	395	0	0
C. Horne, jun., Ramsgate*	340	0	0

MORTLAKE.—For the erection of business premises, Sheen-lane. Mr. Reginald B. Rowell, A.R.I.B.A., architect, Triangle-corner, East Sheen:—

G. E. Sturgis	£2,964 15	G. W. Bates & Son	£2,235 0
S. N. Soole & Son	2,840 0	R. T. Hughes & Co., Ltd., Mortlake	2,217 0
Foster & Dickson, Ltd.	2,775 0		

NEWPORT (I. of Wight).—For excavating for and laying pipes from the waterworks, Carisbrooke, to the new reservoir, for the Town Council. Mr. J. W. Way, engineer, Carisbrooke, I.W.:—

G. Perkins, Newport, I.W. £478 12 6

NEWPORT (I. of Wight).—For 1,128 yds. of 12-in. cast-iron spigot and socket pipes, for the Town Council. Mr. J. W Way, engineer, Carisbrooke, I.W.:—

Cochrane & Co. (Woodside), Ltd., Woodside Ironworks, near Dudley £712

NEW SARUM.—For road works, Meadow-road, South End and North End, for the Town Council. Mr. A. C. Bothams, City Surveyor:—

Meadow-road (North-end).

Wort & Way, Market Place, Salisbury* £47 10

Meadow-road (South-end).

Harold Tryharn, Cold Harbour-lane, Salisbury* 72 0

PENZANCE.—For harbour works, Sennen Cove, near Penzance, for the Harbour Commissioners. Mr. W. T. Douglass, engineer, 15, Victoria-street, Westminster, S.W.:—

For Section 1. of the Breakwater.

A. Carkeek, Redruth, Cornwall* £2,643 19 1

REDDITCH.—For liquefying tanks, etc., at outfall works, and 440 yds. of 9-in. pipe sewer, etc., in Birmingham-road, for the Urban District Council. Mr. A. J. Dickinson, Engineer and Surveyor, Council Offices, Redditch:—

	Sewer.	Sewage Tanks.
J. A. Meridith	£188	£2,005
Tilt Bros.	207	1,990
T. Vale & Sons, Ltd.	210	2,000
G. Trentham	239	2,050
J. & A. Brazier	220	2,150
G. P. Trentham	218	2,185
J. H. Smedley	200	2,279
J. Shrimpton	300	2,300
Sutherland & Thorpe	270	2,351
H. Cooper	200	2,450
Curral, Lewis, & Martin	256	2,426
H. Holloway	—	2,135
G. Huins & Son	—	2,136

SEGHILL.—For extensions to the Boundary Inn, for Messrs. John Rowell & Sons, Ltd., New Brewery, Gateshead-on-Tyne. Messrs. Cackett & Burns Dick, architects, Pilgrim-house, Newcastle-on-Tyne:—

J. C. Hope	£1,342 3 7	J. & W. Simpson	£1,242 18 0
J. B. Harris	1,336 12 2	S. F. Davidson	1,206 11 2
J. & G. Douglass	1,293 1 6	S. Easten, Ltd., Millburn House, Mele*	1,193 13 5
J. P. Bertram & Son	1,278 12 6		
Veitch & Jordan	1,252 5 8		

STOPSLEY.—For erecting a new council school for Bedfordshire County Council. Messrs Gotch & Saunders, architects, 55, George-street, Luton:—

E. Brown & Son, Wellingborough* .. £1,012 10

STROUD.—For painting, decorating, etc., at the Public Baths, Gloucester-street, for the Urban District Council of Stroud. Mr. G. P. Milnes, Surveyor to the Stroud Urban District Council:—

W. C. Court	£45 16 0	G. W. Gould, Uplands, Stroud*	£28 10 6
M. Baxter & Sons	36 0 0		
Gardner & Sons	31 17 6		

TOTTENHAM.—For erecting Nos. 492 to 500, High-road. Messrs. Warran & Stupart, architects, 262, West Green-road, West Green N.:—

W. Moore & Son	£1,869 18 11½
W. Lawrence & Son	1,795 0 0
E. Boxall	1,581 13 11
B. Pettit & Co	1,563 0 0
Rowley Bros.	1,561 0 0
A. Monk	1,550 0 0
H. Knight & Son	1,534 0 0
J. Groves & Sons	1,533 0 0
Hale & Co., Harringay*	1,513 0 0

USHAW MOOR.—For sewage disposal works, for the Lanchester Rural District Council. Mr. J. R. Lupton, Surveyor, Lanchester. Quantities by Surveyor:—

J. Robson & Son, Esh Winning £450

WANSTEAD.—For making-up Hereford-road and Harpenden-road, for the Urban District Council. Mr. C. H. Bressey, Surveyor, Council Offices, Wanstead, N.E.:—

	Hereford-road.	Harpenden-road.
T. Adams	£708 0 0	£1,539 0 0
W. & C. French	620 0 0	1,350 0 0
D. T. Jackson	669 0 0	1,509 0 0
J. Jackson	723 5 2	1,714 2 0
W. Manders	600 0 0	1,385 0 0
Parry & Co.	685 0 0	1,498 0 0
Parsons & Parsons	615 0 0	1,350 0 0

[Surveyor's estimate—Hereford-road, £699 11s; Harpenden-road, £1,427 9s. 4d.]

WATFORD.—For extension of main sewer, Sandy-lane, Northwood, for the Rural District Council. Mr. Ernest Lalley, engineer, Market-street, Watford. Quantities by engineer:—

G. R. Mann, Edgware* £285 16 1

WELFORD and SULBY.—For alterations and additions at Welford and Sulby Schools, for the Managers. Mr. J. T. Blackwell, architect, 53, High-street, Kettering:—

J. Winn & Son	£999 0	A. P. Lewis	£780 0
H. H. Garlick	974 15	R. Cleaver	765 0
Goy & Co.	945 0	T. Hickman	760 0
A. J. Chown	925 0	King & Ridley	758 0
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